

HC 4N5Q 1

# MOTHER AND UNBORN CHILD

---

---

*Meaker*

BOSTONIENSIS

BIBLIOTHECA

MEDICINA

SERVAT ET DOCET



FUNDATA

MDCCCLX

EX DONO

Dolliver Fund

STETTER DEL.





**MOTHER  
AND UNBORN CHILD**



# MOTHER AND UNBORN CHILD

*A LITTLE BOOK OF INFORMATION  
AND ADVICE FOR THE PROSPECTIVE  
MOTHER*

BY

*SAMUEL RAYNOR MEAKER*

*Associate Professor of Gynaecology  
Boston University School of Medicine*



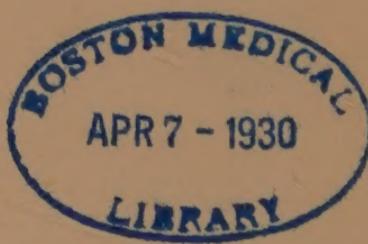
BALTIMORE  
THE WILLIAMS & WILKINS COMPANY  
1927

25. B. 80 Do. 225

COPYRIGHT 1927  
THE WILLIAMS & WILKINS COMPANY

*Made in United States of America*

Published January, 1927



COMPOSED AND PRINTED AT THE  
WAVERLY PRESS  
FOR  
THE WILLIAMS & WILKINS COMPANY  
BALTIMORE, MD., U. S. A.

THIS BOOK IS DEDICATED  
TO  
THE TWO BEST MOTHERS THAT I KNOW



## CONTENTS

CHAPTER	PAGE
I. The Mother, the Baby, and the Race.....	1
II. Some Facts about the Mother's Body.....	6
III. The Development of the Baby before Birth.....	18
IV. The Symptoms and Signs of Pregnancy.....	30
V. The Prediction of the Baby's Birthday, and Certain Other Predictions.....	48
VI. The Everyday Hygiene of Pregnancy.....	66
VII. Certain Troubles and Discomforts, and How to Avoid Them.....	88
VIII. Preparations for the Baby's Coming.....	99
IX. The Arrival of the Baby.....	109
X. The New-born Baby.....	131
XI. The Lying-in Mother.....	154
XII. Nursing, and the Care of the Breasts.....	179



## ILLUSTRATIONS

FIGURE	PAGE
1. The pelvis, together with parts of the spinal column and thigh-bones.....	7
2. A front view of the female organs of reproduction (the organs are laid open to show their internal structure).....	9
3. A side view of the female organs of reproduction (the body is split in the mid-line).....	14
4. An ovum, greatly magnified. ....	18
5. Four spermatozoa, greatly magnified.....	20
6. The pregnant uterus and its contents at about eight weeks...	23
7. The pregnant uterus and its contents at full term.....	26
8. A satisfactory maternity corset, front view.....	81
9. A satisfactory maternity corset, side view.....	81
10. The proper manner of lifting a baby.....	139
11. A weight-chart, showing normal behavior during the first six weeks.....	141
12. Chin-to-chest exercise.....	166
13. Arm exercise.....	167
14. One-leg exercise, with knee bent.....	168
15. Two-leg exercise, with knees bent.....	168
16. Two-leg exercise, with knees straight.....	169
17. Back exercise.....	169
18. Lying-to-sitting exercise.....	170
19. A comfortable and satisfactory position for nursing.....	184
20. A good type of nipple-shield, made of glass and rubber.....	186
21. Nipple-dressing, retained by tapes and adhesive strips.....	194
22. Breast-binder: a towel with darts pinned in below the breasts and shoulder-straps attached.....	195



## CHAPTER I

### THE MOTHER, THE BABY, AND THE RACE

Everybody knows that pregnancy and childbirth are entirely *natural* processes, just as are respiration, digestion, and other bodily functions. Babies were born long before doctors ever existed, and even to-day many thousands of pregnancies go on to a happy termination without any skilled supervision or help.

It would be a great mistake, however, to draw from these facts the conclusion that pregnancy and childbirth are always *normal* processes which should be left entirely to nature. They are among the most complex functions of the body, and like all other complex things they are liable to various derangements and disorders. This is particularly true under the artificial conditions and the stress and strain of modern civilization. There are possible complications of childbearing which, if neglected, not only bring much needless discomfort, but may endanger the future health and even the life of the mother as well as of the baby.

In the older days such mishaps, generally unforeseen and often untreated, were regarded as visitations of Providence. The result was an appalling amount of unnecessary suffering and the loss of many precious lives. To-day our attitude is altogether different. Doctors understand clearly the difficulties and dangers which may arise, and *they know how to avoid them*. Never before has the process of childbearing been so safe as it can be to-day, provided the expectant mother is willing to do her part in making it so. And her part is very simple: she must secure medical care from the

beginning of pregnancy, and then, like a good soldier, obey implicitly the orders of her doctor.

We still find occasional patients among the ignorant who feel that pregnancy will take care of itself, and that they have no need of a doctor until labor actually begins. There is no more distressing experience in the practice of medicine than to be confronted suddenly in such a case by a serious or alarming complication which might easily have been foreseen and averted.

If this book teaches no other lesson, let it impress upon the reader that *every pregnant woman ought to be under the doctor's care from the beginning*. In the following pages we shall often refer to the expectant mother as the *patient*. By this we do not mean to imply that she is sick or suffering; indeed, many women enjoy better health during pregnancy than at any other time. The term is used to emphasize that the mother should be in the hands of her physician, even though nothing is required of him except careful observation, and advice about her general mode of living.

He will want to see her at least once a month, and somewhat oftener as the time of confinement approaches. If all is going well, as it happily does in the great majority of cases, it is reassuring to be certain of that fact. If there are minor discomforts, they can almost always be alleviated by proper treatment. If indications of real trouble should appear, the one vitally important thing is to recognize them early. There is no sort of patient to whom the doctor will do less than to the pregnant woman, when everything is normal; there is none for whom he *can* do more, if the need arises.

This book is not intended to take the place of any doctor's personal advice. But while the busy practitioner is well able to give his patient the good care which will insure

her comfort and safety, he often has not the time for leisurely explanations and discussion of the many developments which naturally interest the prospective mother. The average intelligent woman of to-day has a keen desire to understand any experience which comes to her, and particularly this most momentous of all experiences. There are current so many "old wives' tales" and so much misinformation, ignorance, and superstition in regard to pregnancy and childbirth, that the mother-to-be is often beset by wholly unnecessary perplexities and fears. These are at once dispelled if she understands clearly the process by which nature has arranged that our race shall be reproduced, and is able intelligently to watch the out-working of it in her own body. She will be better enabled to coöperate with her doctor if she learns *why* as well as *how* she should carry out the various instructions which he gives her, and *when* she ought to bring special matters to his attention. To supply such understanding and knowledge is the purpose of this book.

The practice of medicine in the past was mainly *curative*, and sought to make sick people well. To-day it goes further, and is *preventive*. It aims to keep healthy people from becoming sick. Much has been accomplished toward this end by checking the spread of contagious diseases, eliminating the risks of hazardous occupations, and improving the general hygienic conditions of life. The medicine of the future will without a doubt develop largely along lines of hygiene, the prevention of disease, and the care of the public health.

Of all departments of public health work, one of the most interesting and satisfactory is baby hygiene and child welfare. The results obtained in this field during the past decade are indeed remarkable. With regard to the older children, the early prevention or correction of defects and

the proper regulation of hygiene insures a coming generation of strong and healthy adults. In the case of the babies, the outstanding result has been a reduction in the infant death-rate, which in some localities has been cut in half. Surely no expenditure of time, effort, and money can pay better dividends than this. The obvious importance of healthy children as a national asset has led to work of this sort being undertaken by the Federal Government, as well as by a large number of private organizations.

In order to accomplish most, the campaign for better babies must begin a long way back. It ought really to start with the care of the developing girl, because the management of the important adolescent period in a girl's life often makes or mars her future capacity for normal motherhood. It should take up the matter of eugenics, and aim to promote the best and wisest marriages. It properly lays great stress upon maternity welfare, since the health of mothers is absolutely essential to the bearing of healthy babies.

We appreciate now that every effort made to improve the conditions of pregnancy and childbirth is immensely worth while, not only because of the immediate benefit to the mothers, but because such efforts result also in the betterment of our babies and in a healthier posterity. *Prenatal care*, as the doctor's supervision of the pregnant woman is called, is the contribution made by modern obstetrics to the general progress that every department of medicine is making today in the prevention of disease and the safe-guarding of health. It serves two patients at one time, and the value of its service has already been proved by the saving of thousands of lives.

The unselfish devotion of mothers to their children is a beautiful thing. May the day soon come when all women realize that their responsibility begins nine months before

their babies come into the world, and that by caring for themselves during that period they are securing for their children the privilege of being well born. There is no one, rich or poor, to whom the opportunity for proper care of this sort is denied; and when once the value of it is appreciated, there is no one who will neglect the opportunity. The result will be insured health and safety for the mothers, and that is important enough; but more important still is the increased welfare of the babies, for that is the welfare of our future men and women, and upon that depends our hope of a better and a stronger race.

## CHAPTER II

### SOME FACTS ABOUT THE MOTHER'S BODY

In order to understand in a general way the beginning of a new life, the development of the baby in the womb, and the process of birth, the reader must know something about those parts of the mother's body which are concerned in carrying out the highest of all physical functions—the function of reproduction. Such knowledge is of interest to any intelligent woman and may also be of practical value, because the mother will naturally be better able to care for herself and to coöperate with her doctor if she has a clear idea of the wonderful arrangements that Nature has made.

The pelvis is a very irregular ring or girdle composed of three bones: the two *innominate bones*, of which the flaring edges are the "hips"; and the *sacrum*, or lower part of the spinal column, which is placed between the innominate bones behind. There are three joints in the pelvic girdle: one in front, the *symphysis pubis*, where the two innominate bones meet; and two behind, the *sacroiliac joints*, where the innominate bones join the sacrum. At the time of delivery all of these joints relax somewhat to make the passage of the baby easier. Since the thigh-bones are joined to the innominate bones, the pelvic girdle thus forms the bony connection between the trunk and the lower limbs.

We have spoken of the pelvis as a ring or girdle; it might equally well be regarded as a bony basin without a bottom. The basin has two divisions: a larger upper part called the *false pelvis*, and a smaller lower part known as the *true*

*pelvis.* At the junction of these parts is the narrowest and most constricted portion of the pelvic cavity; this we call the *inlet*.

In the non-pregnant state the female organs of generation lie within the true pelvis, to the walls of which they are attached by ligaments. The pregnant uterus, however, enlarges and rises up into the more roomy false pelvis, and

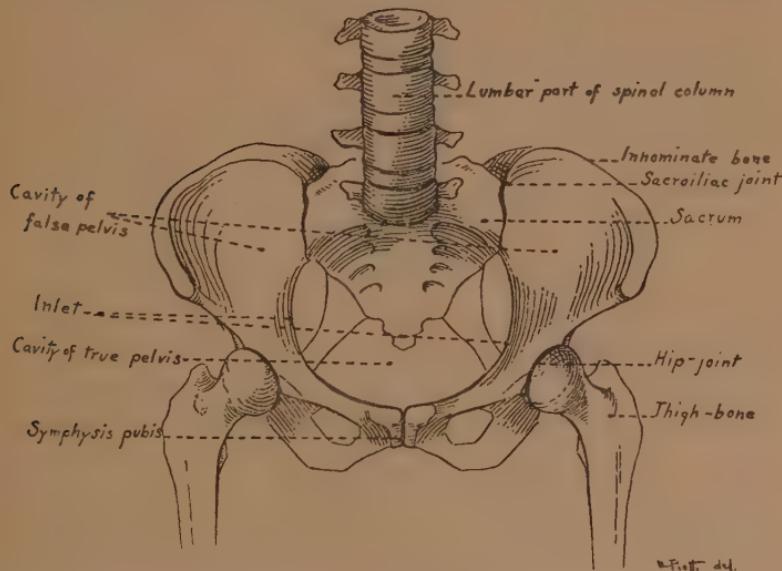


FIG. 1. THE PELVIS, TOGETHER WITH PARTS OF THE SPINAL COLUMN AND THIGH-BONES

into the abdomen. Since before birth the baby must pass down through the true pelvis, the question of the size of that cavity, particularly at the inlet, becomes very important. For this reason doctors carefully measure the pelvic bones of their pregnant patients, and in cases in which it seems likely that there might be some obstruction to the passage of the baby's head they prepare to give

Nature such assistance as may be necessary at the time of labor. In this particular, as in many others, forewarned is amply forearmed.

The pelvic floor is a sort of sling or hammock, composed of muscles together with their tough sheaths and coverings, which is attached all around to the inside of the bony pelvis and serves to close its lower opening, or *outlet*. In other words, the muscular floor provides a bottom for the bony basin; it gives support to all the organs contained within the true pelvis.

There are openings in the pelvic floor for three structures: the *urethra*, or water-passage leading from the bladder; the *vagina*, to be described presently; and the lower bowel, of which the termination is called the *anus*.

An important part of the pelvic floor is the *perinaeum*, a thick mass of tissue situated behind the opening of the *vagina* and in front of the *anus*. This is a central point where the different muscles and other tissues of the floor come together, and it might be likened to the keystone of an arch because the whole strength of the floor depends more or less upon the integrity of this central part. In childbirth the *perinaeum* is always greatly stretched and sometimes partially torn. Such tears are commonly repaired by stitches, since if this were not done the weakened pelvic floor might fail properly to support the internal organs.

The ovaries are two soft bodies, oval in shape and about an inch and a half in length. They are attached to the womb by delicate ligaments, but lie well out toward the two sides of the pelvis. Each ovary is close to the open end of the corresponding Fallopian tube.

The ovaries have two separate functions. In the first place, they produce the sex-cells of the female—the eggs, egg-cells, or *ova*. In the second place they manufacture a

so-called *internal secretion*—a substance which enters the blood and exerts a profound influence, as we shall later see, upon the whole body.

Let us consider first the function of egg-producing, or, as it is technically called, *ovulation*.

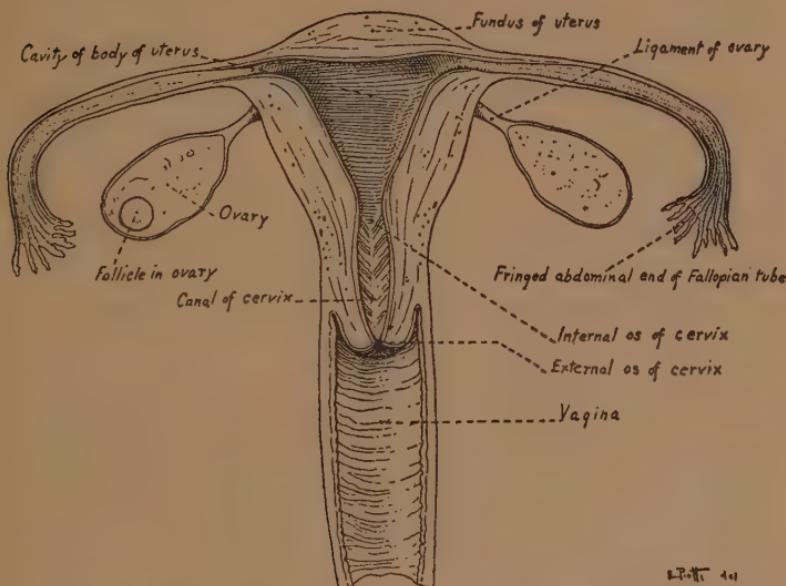


FIG. 2. A FRONT VIEW OF THE FEMALE ORGANS OF REPRODUCTION (THE ORGANS ARE LAID OPEN TO SHOW THEIR INTERNAL STRUCTURE)

The ovaries of a girl-baby each contain twenty thousand or more egg-cells. These young ova are, however, immature and incompletely developed. They remain so during childhood, while many of them degenerate and disappear.

Beginning at puberty and continuing until the change of life, a certain number of egg-cells complete their development and become mature. Ovulation, the production and

discharge of a mature ovum, probably occurs once every four weeks over a period of about thirty years. Hence approximately four hundred fully developed ova in all are produced by a woman's two ovaries during the entire period of her active sex-life, while the rest of the forty thousand young egg-cells which were present in her ovaries at birth never reach maturity, but sooner or later disappear. Here we see an illustration of the lavish provision which Nature sometimes makes in excess of the body's needs. A woman who has lost one ovary, or even one and part of the other, may still remain in every way normal and have children of either sex.

Ovulation is really a very complex process. In the substance of the ovary there forms a little hollow sac about half an inch in diameter known as a *follicle*; this is filled with watery fluid. The ovum itself is embedded at some point in the lining of the sac. As the follicle grows it reaches the surface of the ovary. When it has attained full size it bursts through the surface-covering, and in the gush of fluid which then takes place the ovum is carried out of the follicle and into the abdominal cavity.

The ovum is very tiny, hardly big enough to be visible to the naked eye; and the wonder is that it does not always lose itself in the relative vastness of the abdomen. No doubt this sometimes happens; but in most cases the egg is attracted, by means which we do not fully understand, into the near-by open end of the Fallopian tube. There it may become fertilized if a spermatozoon is present; otherwise it passes down the tube and out through the womb, and is lost.

After the rupture of the follicle and the discharge of its contents, its cavity at first fills with blood. Within a few days, however, the blood is replaced by a mass of yellowish cells, called a *corpus luteum*. In the course of

weeks or months the corpus luteum shrinks down to a minute white scar, and this is permanent. The ovaries of a middle-aged woman will show a multitude of such scars, each the relic of a past ovulation.

Obvious interest has always attached to the relation between ovulation and menstruation, since both are periodic phenomena occurring at regular intervals of about twenty-eight days. Although we know that either can take place without the other, there is undoubtedly some connection between the two. In all probability an ovum is ordinarily discharged from one of the ovaries shortly after each menstrual period.

The second function of the ovaries is quite distinct from ovulation. We shall now go on to consider them as *glands of internal secretion*.

The body contains a number of organs which belong to this group of glands. Other examples beside the ovaries are the thyroid gland in the neck, the pituitary gland at the base of the brain, and the adrenal glands just above the kidneys. The microscopic "islands" of the pancreas are also included in this group; they are of particular interest at present because from them is extracted the recently discovered *insulin* which is now used in the treatment of diabetes.

These organs all have the property of producing substances, or secretions, which they pour out, not through ducts, but directly into the blood-stream. For that reason they are called *ductless glands*, *glands of internal secretion*, or *endocrine glands*.

While our knowledge of the endocrine glands is still in its infancy, we have learned enough in the past twenty years to realize that they very largely regulate the growth and development of the body, as well as some of its most important activities. There is no doubt that the future

holds further discoveries along these lines, and that the result will be valuable progress in our ability to treat certain diseases.

To a considerable extent the whole group of endocrine glands is interrelated; they all act together, and the function of each influences all the others. It is impossible, therefore, to speak definitely about the function of any one of these glands, since no one ever works by itself.

Of the ovaries as endocrine glands we may say that in general they control the development, and later the maintenance, of the female sex-characteristics. The most striking effect of removing the ovaries from a woman in the prime of life is the abrupt and permanent cessation of menstruation. If they are removed in childhood the patient will never menstruate, and will fail also to exhibit many of the other changes, physical and mental, which normally take place at puberty to mark the transformation of the girl into the woman.

The corpus luteum, each time it forms, probably produces an additional internal secretion of its own, which is supposed to have two special functions. On the one hand, it stimulates the lining of the womb to become a favorable environment for a fertilized ovum. On the other, in event of pregnancy occurring the secretion of the corpus luteum then acts upon the ovaries themselves, and usually prevents for the time being the maturing of any additional egg-cells.

**The Fallopian tubes** are two passage-ways, each rather more than four inches in length and about as big around as a lead-pencil. They lead off from the right and left upper corners of the womb and extend sideways, the outermost one-third of each tube curving around so as to end close to the corresponding ovary.

These tubes are, of course, hollow. At their inner or uterine ends their channels are continuous with the cavity

of the womb. At their outer or abdominal ends they open directly into the cavity of the abdomen. Where the tubes enter the womb their channels are very minute, scarcely large enough to admit a bristle, while at the abdominal ends they are considerably larger, flaring more or less like the bell of a trumpet. Around its expanded abdominal end each tube is provided with a sort of fringe, which probably helps to guide into the tube the ova discharged from the ovary.

The lining of the tubes is thrown into many folds, and is beset with innumerable tiny projections known as *cilia*, which resemble the bristles of a very soft moist brush. These cilia are capable of active motion; they wave gently back and forth somewhat like a field of grain in the wind. It is in part through their agency and in part by the action of muscle-fibers in the walls of the tubes that the ova, which have in themselves no power of movement, are carried slowly down into the womb. The Fallopian tubes are sometimes given the name of *oviducts* because their function is to serve as passage-ways or ducts for the ova.

The uterus, commonly called the *womb*, is a hollow organ with thick muscular walls. In the non-pregnant state it is about three inches long and weighs in the neighborhood of two ounces. Its shape is that of a rather flattened pear, the smaller end pointing downward.

The larger upper portion of the womb is its *body*, the term *fundus* referring to the very top; the lower and smaller portion is the *neck*, or *cervix*.

The cavity of the body of the uterus is roughly triangular. At each of its upper corners it leads into one of the Fallopian tubes. Below, it is continuous with the cavity or canal of the cervix. The cervical canal is tubular and narrow. Above, as we have just said, it communicates with the uterine cavity, while it opens below into the vagina.

It is constricted somewhat at both upper and lower ends, these points being known by the Latin word for mouth as the *internal os* and the *external os* respectively.

The womb as a whole is located at the top of the vagina, into which the cervix projects a little way. In the majority of cases the womb is bent forward and rests lightly against the bladder, above and behind which it lies. Its position

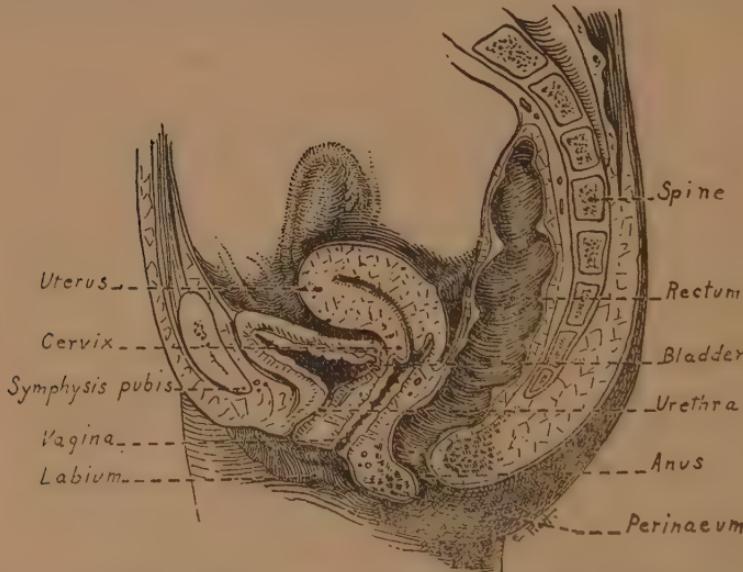


FIG. 3. A SIDE VIEW OF THE FEMALE ORGANS OF REPRODUCTION  
(THE BODY IS SPLIT IN THE MID-LINE)

is, however, subject to a good deal of normal variation. The healthy organ is never rigidly fixed, but is slung or suspended by ligaments with a laxity which allows considerable freedom of movement. In the past doctors used to attach much importance to so-called displacements of the uterus, and even to-day patients themselves believe that a "tipped womb" is something very serious. It is

true that occasionally a displacement causes trouble and needs to be corrected, but in very many cases the uterus deviates markedly from the usual position without the slightest resulting harm. Twenty women out of every hundred have some degree of backward displacement, but not more than one or two out of the twenty ever experience any ill effects or require any treatment on that account.

The lining of the uterine cavity interests us particularly for two reasons: it constitutes the bed or nest in which the fertilized ovum becomes implanted, as will be described in the next chapter; and it is the region where active changes go on in the process of menstruation.

As everyone knows, *menstruation* is a periodic function, recurring regularly every four weeks or thereabouts throughout the thirty-odd years between puberty and the change of life, and interrupted under normal conditions only by pregnancy and nursing.

This striking phenomenon has from ancient times been the subject of much speculation; many strange theories have been advanced to explain it. The commonest idea, and one still held by ignorant people, is that the menstrual flow involves in some way the elimination of impurities and is therefore essentially unclean.

While the real significance of menstruation is not perfectly understood, we know at least that it depends upon changes in the lining of the womb which are designed to make that lining richer soil, so to speak, for the implanting of a fertilized ovum. If an ovum becomes implanted, menstruation stops; but as long as no fertilized ovum reaches the uterus, the process of preparing the soil keeps on occurring expectantly month after month.

Changes in the uterine lining start nearly a week before there is any actual flowing. The whole lining becomes thick, soft, and greatly congested with blood. It is now ready for

the reception of an ovum. If that does not take place, the blood breaks through into the cavity of the uterus, whence it passes out into the vagina and appears externally as an obvious flow. After four or five days, on the average, the flowing stops, and then begins a process of repair which lasts about four days. The congestion and thickening of the womb's lining subside, and the points at which blood has broken through heal over. Next follows a resting stage of twelve days or so, after which the entire cycle of changes begins again. So we see that the flowing by itself is only one item in a whole group of menstrual happenings. In fact, the appearance of a flow indicates that the menstrual changes of that particular period have failed of their biological purpose.

In passing, we might say a few words about the common disorders of menstruation. The flow is often painful; it may be irregular, excessive, scanty, or abnormally absent. Women are rather prone to let these conditions go on, or to experiment with foolish patent medicines. In so doing they make a great mistake. Things easy to correct in the beginning often become difficult if they are permitted to grow chronic, and occasionally turn out to be serious. The neglect of painful menstruation in young girls allows much unnecessary suffering to continue and in some cases impairs their later chances for healthy motherhood. The neglect of excessive flowing at any time is the disregard of an emphatic danger-signal. There are no symptoms which require the doctor's advice more than do disturbances of the menstrual function.

**The vagina** is the passage-way leading from the neck of the womb to the outside of the body. It is three inches or more in length, and lies between the bladder in front and the rectum behind. The vagina receives the greater part of the male seed at the time of the marital relation; it pro-

vides a channel for the outflow of menstrual blood; and it constitutes the birth-canal by which the baby, escaping from the uterus, makes his way into the outer world.

The term *vulva* refers to the external genital organs. On each side are thick folds known as *labia*, or lips, between which lie the openings of the vagina and the urethra. Just back of the vaginal opening is the perinaeum.

The breasts are two large rounded masses on the front of the chest-wall, one on either side. At the center of each is a small projection, the *nipple*, around which there is a circular area reddish or brownish in color, known as the *areola*.

The breast of a woman not pregnant or nursing consists, underneath the skin, mainly of fat and fibrous tissue. Scattered throughout the organ, however, there are minute clusters of inactive gland-cells, from which some fifteen or twenty tiny tubes, the *milk-ducts*, lead to the nipple. This glandular tissue is very small in amount prior to pregnancy.

Soon after conception the gland-cells begin to grow and multiply, until at the end of pregnancy the breast contains a great deal of gland-tissue, which is distributed in innumerable small masses grouped around the end of each milk-duct like a bunch of grapes on a stem. By this gland-tissue are produced at first the watery colostrum, and later the milk.

The changes in the breasts during pregnancy and the secretion of milk after childbirth show how intimately these glands are connected in function with the pelvic organs. Further illustrations of the same connection are seen in the development of the breasts which occurs at puberty, and in the swelling or tenderness which some women experience in them at each menstrual period. The breasts are, in fact, accessory glands of the generative system.

## CHAPTER III

### THE DEVELOPMENT OF THE BABY BEFORE BIRTH

In the preceding chapter we several times used the word *cell*. We referred to the ovum as an egg-cell, and mentioned gland-cells in the breast. Let us now describe in some detail what this term means.

A cell is a small mass of a jelly-like substance called *protoplasm*, containing a still smaller body, the *nucleus*. The protoplasm is surrounded by a delicate membrane, or *cell-wall*. In size most cells are so minute that they can be seen only with the aid of the microscope. In shape many tend to be spherical, but other forms in great variety are common.

The simplest sort of animal consists of a single cell, which is capable by itself of carrying on all the functions of life. Such tiny one-celled creatures are able to move, to take in food, to put out waste, and to respond to the stimulation of outside influences. They reproduce their kind by the elementary process of dividing into two, so that the result is two new cells, each exactly like the original one.

A complex body such as the human contains countless millions of cells of many different sizes and shapes, each sort having its own special function. Apart from the cells themselves, a considerable portion of the human body consists of substances produced by those cells—for example, the fluid part of the blood and the heavy structure of bone.

And yet, in spite of the exceedingly complicated character of the adult body, the fact is that each human individual begins life as a single cell which is not so very different from the amoeba or one of the other simple one-celled animals.

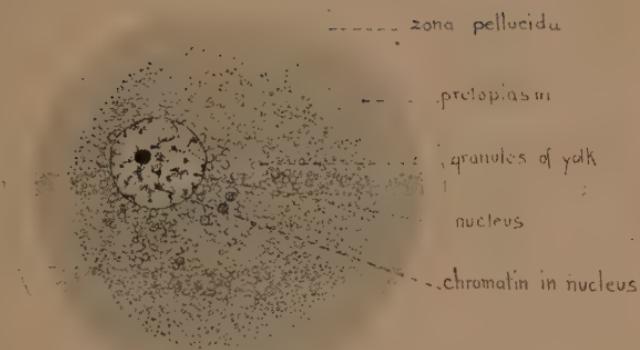


FIG. 4. AN OVUM, GREATLY MAGNIFIED



That single cell, destined to develop into a complete human body, is the fertilized ovum—the egg-cell of the mother after it has been fertilized by the spermatozoon of the father.

The ovum, or egg-cell, or egg, has been to some extent described in Chapter II. It is spherical and shape and large compared with most cells in the body, measuring about  $\frac{1}{15}$  of an inch in diameter—just big enough to be seen as a tiny speck with the naked eye.

Surrounding the ovum is a soft transparent membrane known as the *clear zone*—in Latin, the *zona pellucida*. There is not, of course, any hard shell like that encasing the egg of a bird, since the human egg, carefully hidden away in the mother's body, needs no such protection.

The protoplasm of the ovum contains numerous fine granules of yolk. This is much less in amount than the yolk in the eggs of birds, and for a good reason. The embryo bird has during the entire period of development no source of nourishment except the yolk provided in its egg. The human embryo, on the other hand, very early becomes attached to the lining of the mother's womb, and from that time on draws nourishment from her blood. Hence the yolk in the human ovum is intended to meet the needs of the first few days only.

The nucleus is a small round body situated somewhere near the center of the egg-cell. In the nucleus of the ovum, as in that of every other cell, there are contained a number of irregular masses of a material known as *chromatin*. We shall hear more about chromatin later in the present chapter, and again when the subject of heredity is discussed in Chapter V.

The spermatozoon is the sex-cell of the male parent, corresponding to the ovum of the female. But while the female produces only one ovum each month, and though

only one spermatozoon is required for fertilization, the male is constantly producing spermatozoa in enormous numbers.

The human spermatozoon is a cell about  $\frac{1}{400}$  of an inch in length, and therefore visible only under high magnification. Its shape is very different from that of any ordinary



FIG. 5. FOUR SPERMATOZOA, GREATLY MAGNIFIED

cell, for it somewhat resembles a tadpole, having a relatively large head and a very long thin tail.

In the head of the spermatozoon is its nucleus which, like the nucleus of the ovum, contains a definite amount of chromatin.

The elongated tail is capable of movement and serves as a propeller, enabling the spermatozoon to swim about with

the utmost freedom. The remarkably lively activity and great number of spermatozoa seen in a fresh specimen under the microscope call the mind the appearance of an ant-hill.

**The fertilization of an ovum** is accomplished by the ovum and a spermatozoön uniting to form a single cell. This occurrence is *conception*, and marks the actual starting-point of a new life.

In the preceding chapter we saw that each month one or the other of the ovaries produces and discharges a mature ovum, which finds its way into one of the Fallopian tubes. If it does not there encounter a spermatozoön (and generally, of course, it does not), it passes down into the uterus and is lost.

At the time of the marital relation the male contributes some millions of spermatozoa, most of these reaching the vagina only, but some getting directly into the cervix. Of the latter a certain number make their way, by their own power of swimming, up through the uterus and out into the tubes. They reach this point within an hour or so, and are able to live in the tubes for several days. Ultimately they all die, disintegrate, and disappear, with the possible exception of a single one which may fulfil the function of fertilization.

The ovum and the spermatozoön meet in the tube, usually somewhere near the abdominal end. The spermatozoön pierces the clear zone and penetrates into the protoplasm of the ovum. Having entered the egg-cell the spermatozoön loses its tail, and its nucleus becomes fused with that of the ovum. Thus in the nucleus of the fertilized ovum the chromatin contributed by both parents is united. This fact is of fundamental importance with reference to heredity.

**The development of the ovum** into a new individual begins immediately after fertilization. Growth is brought

about by a repeated process of cell-division. The fertilized ovum divides into two cells, those two divide into four, the four into eight, and so on until within a short time the *embryo*, for such we may now call it, consists of some thousands of cells.

The earliest stages of development take place in the tube, for the journey down into the uterus occupies seven or eight days. Occasionally it happens for some reason that the embryo does not complete this journey, but remains in the tube and continues to develop there. In that case we have what is known as a *tubal* or *extrauterine pregnancy*. Since it is impossible for such a condition to go on to a normal termination, surgical interference almost always becomes necessary.

In the great majority of cases, however, the passage down the tube and into the womb is safely accomplished. When the growing mass of cells arrives in the uterus it is perhaps as large as the head of a pin. Of this whole structure only a small part is the embryo proper, or future baby; the rest goes to form the placenta and the membranes that surround him, which will presently be described.

Upon arriving in the uterus, the embryo with his surrounding membranes becomes attached at some point to the uterine lining which, as was explained in Chapter II, prepares itself regularly each month to receive him. In a very short time connections are formed between the outer membrane and the lining of the womb, of such a nature that the embryo is now able to receive nourishment from the mother's blood and no longer needs to depend upon his own scanty supply of yolk.

The further development of the embryo goes on in the uterus for approximately nine calendar months. Various abnormalities in the embryo, the uterus, or the attachment of embryo to uterus may, however, bring about a termina-

tion of the pregnancy at any time. If this happens during the first sixteen weeks, it is properly called an *abortion*; in the seventeenth to twenty-eighth weeks it is known as a *miscarriage*; and after the twenty-eighth week, when the baby has a chance of surviving, it is termed a *premature birth*. While these accidents are fairly common, the major-

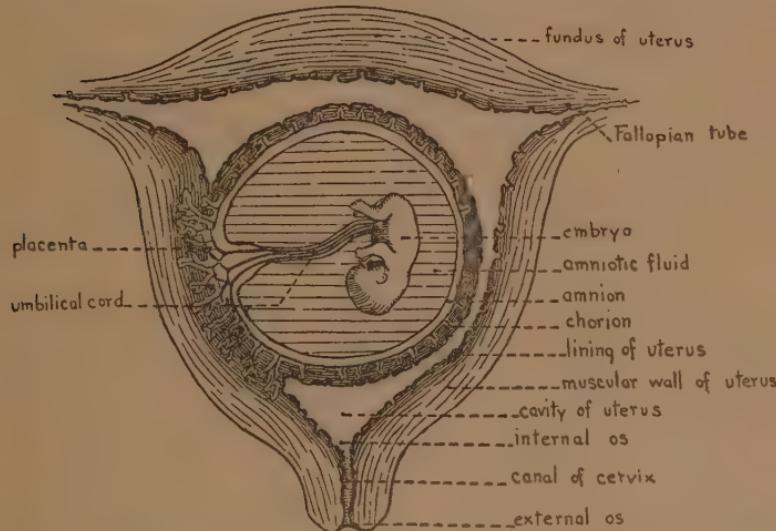


FIG. 6. THE PREGNANT UTERUS AND ITS CONTENTS AT ABOUT EIGHT WEEKS

ity of pregnancies, as everyone knows, continue up to the normal full term of about forty weeks.

*At the end of the eighth week the appearance of the embryo, his membranes, and the uterus is as illustrated in Fig. 6.*

The embryo himself is very small compared with the structures that surround him. He is floating in fluid, and is suspended by a cord to the inside of the bag or sac in which that fluid is contained.

This bag, sometimes called the *bag of waters*, is composed

of two membranes; its wall is therefore two layers thick. The inner membrane, known as the *amnion*, is very delicate. Since it forms the lining of the bag it directly incloses the fluid, to which for that reason the term *amniotic fluid* is often applied.

The outer membrane is the *chorion*. This is thicker and more or less shaggy, its surface being beset with innumerable tiny branching projections called *villi*, each one somewhat like a miniature tree. At the point where the chorion has become attached to the lining of the womb these villi have burrowed into the lining and are bathed in the mother's blood. It is here that the *placenta* is going to develop. Since the baby's blood circulates within the villi and the mother's blood surrounds them, food and oxygen from the mother and waste from the baby are easily exchanged, passing freely through the thin walls of the villi. In spite of this close relationship there is no mingling of blood, for the two circulations, maternal and embryonic, always remain quite distinct.

The connection between embryo and membranes is the *umbilical cord*. It runs from the navel of the embryo to the developing placenta, and contains two arteries through which the embryo's blood reaches the villi, and a vein by which the blood returns again to the embryo.

At the eighth week the embryo himself bears an unmistakable resemblance to a full-term baby, though he is little more than an inch in length. His head is relatively large because his brain has been growing very rapidly. Arms, legs, and even fingers and toes are definitely formed. There is a rudimentary tail, which will shortly disappear. All the important internal organs have already started upon their process of growth.

*At the end of the third calendar month the embryo is three inches long and weighs about two-thirds of an ounce.*

The beginnings of nails have appeared on the fingers and toes. The eyelids are well developed but are closed, like a kitten's at birth, and will remain so until some time during the seventh month. By the twelfth week there are obvious differences in the external genital organs which make it possible to distinguish sex.

*At the end of the fourth month* there has been a considerable growth, the embryo measuring about six inches in length and weighing four ounces. During and after this month the term *fetus* is commonly used to designate the developing baby.

*At the end of the fifth month* the fetus is nine inches long and weighs in the neighborhood of eleven ounces. He looks thin and wrinkled, since very little fat has as yet developed under the skin. His muscles are beginning to be well formed; it is during the fifth month, as a rule, that the baby's movements are first vigorous enough to be felt by the mother.

*At the end of the sixth month* the length of the fetus is thirteen inches and his weight two pounds. His body is more or less completely covered with very fine hair, known as *lanugo*; this will be lost before birth. On the skin there appears a cheesy substance called *vernix caseosa*.

*At the end of the seventh month* the fetus has attained a length of sixteen inches and a weight of three and a half pounds. A fair amount of subcutaneous fat is now present. His eyes are open. During this month there occurs a great development of the more complex parts of the nervous system.

A child born in the seventh month of pregnancy has a fair chance of living, particularly if he can receive the skilled care which hospitals, with their incubators and other special equipment, are able to give to the premature baby. There is, however, no truth in the popular belief that the

seven months' child is more likely to do well than one born in the eighth month. Each additional week of growth and development within the womb adds greatly to the baby's chances for independent survival.

*At the end of the eighth month* the fetus is eighteen inches long and weighs about five pounds. His subcutaneous fat has further increased, so that he is no longer wrinkled and

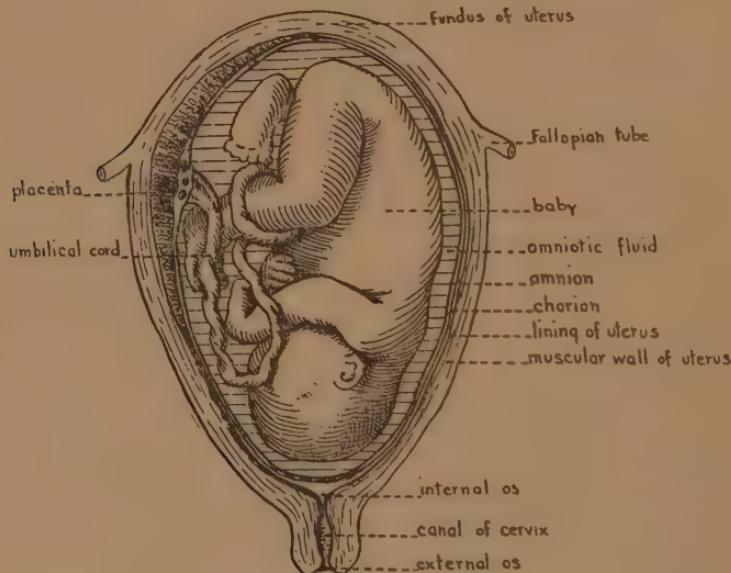


FIG. 7. THE PREGNANT UTERUS AND ITS CONTENTS AT FULL TERM

old-looking. The lanugo has begun to disappear, and on the scalp there is now a certain amount of true hair. The nails have grown to or beyond the tips of the fingers and toes.

*At the end of forty weeks*, or a little more than nine calendar months, pregnancy reaches *full term*, and the baby's development in the womb is completed. Fig. 7 shows the appearance of the womb and its contents at this time.

The length of the baby is now about twenty inches; among full-term infants there is not much variation from that figure. His weight averages seven to seven and a half pounds, but is often as little as five pounds or as much as ten. The general bodily appearance is that of the newborn baby.

*The position of the baby in the womb* may change from day to day throughout pregnancy, but in the last two or three weeks he usually takes and keeps that position which will exist at the time of labor. In about ninety-six per cent of cases the baby lies head downward; the head *presents*, as doctors say. In rather less than three per cent the position is reversed, the buttocks, or in medical language the *breech*, being the presenting part. Cases of the more unusual positions make up the remaining one per cent.

In Fig. 7 is shown the commonest position of the baby in the womb at full term. The crown of his head rests against the internal os. His face is directed toward the mother's right side, and his back toward her left. His arms are folded over his chest and his legs are drawn up, so that he occupies the smallest possible space. Since in this position the arms and legs, or *small parts*, are on the mother's right, it is on that side that she generally feels the child's movements more strongly. His buttocks are at the upper part, or fundus, of the womb. In most cases the doctor can easily identify the different portions of the baby's body by an external examination, and so determine before birth the position in which he is lying.

The *umbilical cord*, or "navel-string," runs from the child's navel to the center of the placenta. It is ordinarily about twenty inches long—sometimes less, and sometimes a great deal more. Its average thickness is that of a woman's thumb, but it is irregular and "knobby," having numerous twists as well as bunchy thickenings which are called false

knots. As a rule the cord is slack and loosely coiled around the baby's limbs, but not uncommonly it makes a turn or two around his neck or trunk.

The baby lies within the bag of waters, of which the wall is formed by the two membranes, the inner amnion and the outer chorion. The relations of these structures are essentially the same at full term as they were at the eighth week (Fig. 6), except that now the bag of waters entirely fills the womb, and so there is no space between the chorion and the uterine lining. The baby himself is relatively much larger and occupies the greater part of the space within the bag.

The *amnion* lines the bag of water, covers the umbilical cord, and is continuous at the navel with the baby's skin. It is a delicate but tough membrane, silvery and transparent.

The *amniotic fluid*, "the waters," varies a good deal in amount, the quantity being normally anywhere between one pint and two quarts. This fluid has important mechanical functions. During pregnancy it acts as a water-cushion, protecting the fetus from pressure and from external violence, and allowing him room to move freely. At the time of labor, as we shall see in Chapter IX, it forms a water-wedge, the action of which greatly facilitates the stretching open of the mouth of the womb.

The *chorion* has become considerably modified. At the eighth week of pregnancy its entire surface was covered with villi, both at the point of attachment to the uterus and elsewhere. Now, at full term, the villi have disappeared from all parts of the chorion excepting in the placenta; everywhere else the chorion is smooth and thin.

The *placenta*, or "mother-cake," is a flat circular structure about seven inches in diameter and three-quarters of an inch thick; it weighs, on the average, a pound and a quarter. This large fleshy mass of tissue belongs partly to

the baby and partly to the mother. On the baby's side the placenta is that portion of the chorion from which the villi have not disappeared, but have on the contrary grown and multiplied. On the mother's side the placenta is a special portion of the uterine lining containing large blood-spaces into which the chorionic villi project. The two constituents, fetal and maternal, are firmly united and together make up the fully developed placenta.

The term *afterbirth* is ordinarily used to include placenta, membranes, and umbilical cord, since these structures are all expelled from the uterus after the birth of the child.

The *womb* itself has undergone noteworthy changes during pregnancy. As described in the previous chapter, it was at the beginning a thick-walled organ some three inches long and weighing about two ounces. At the end of pregnancy its walls are thin and its cavity is relatively enormous; it is fifteen inches or more in length, and weighs approximately two pounds. Its lining has everywhere been greatly modified, and has at one point contributed to the formation of the placenta. Its muscle-fibers have increased to a remarkable degree both in size and in number, and are now ready to supply the mechanical force which in the process of birth will open the mouth of the womb and help to expel the baby.

## CHAPTER IV

### THE SYMPTOMS AND SIGNS OF PREGNANCY

How do we recognize that conception has taken place? This question is naturally of great interest to the young wife who is looking forward to motherhood, and wishes to know and understand the earliest indications that her hopes are going to be fulfilled. It is important that the prospective mother should appreciate her condition promptly, because she can do certain things from the very beginning, with her doctor's advice and help, which will insure her own comfort and safety and the welfare of her baby.

There is ordinarily no difficulty about the recognition of early pregnancy. The usual indications are familiar to every matron. In fact, the patient herself is well aware of her condition, as a rule, before she consults the doctor, and expects him merely to confirm her belief.

The so-called *positive* signs of pregnancy do not appear until the fifth or sixth month. At that time it is possible to outline the different parts of the baby's body, to feel the movements of his arms and legs, to hear his heart-beats, and to see his bones in an x-ray picture. These are positive signs indeed, and leave no room whatever for uncertainty.

Previous to the fifth month the diagnosis of pregnancy depends upon evidences that are *presumptive* or *probable*, but not *positive* or scientifically certain. There are occasional cases, puzzling for one reason or another, in which the most experienced physician cannot say with assurance whether or not pregnancy exists until he has carefully observed the patient for weeks, or even months. It may

seem strange, considering the millions of pregnancies that have been watched and studied, that an absolutely positive decision cannot be reached earlier. In the large majority of cases, however, a presumptive diagnosis is made by the patient or her doctor within the first few weeks, and this nearly always proves to be correct.

In investigating any bodily condition, normal or otherwise, the doctor draws his conclusions from *symptoms* and *signs*. The symptoms are the things observed and described by the patient, and are mainly of a subjective character—that is, they are her sensations or feelings. Symptoms are commonly thought of as unpleasant items, or complaints, but are by no means necessarily so, since they are things of *any* sort that a patient notices about herself. The signs, on the other hand, are *objective*—they can be seen, or felt, or otherwise perceived by another person, and are discovered by the doctor in the course of his examination. In a case of broken leg, for example, pain would be a symptom, while swelling and deformity are signs.

### THE EARLY SYMPTOMS

There are four symptoms so commonly occurring in early pregnancy that in making the diagnosis we regard them as very significant. These are: the cessation of menstruation, changes in the breasts, stomach disturbances, and irritability of the bladder.

**The Cessation of Menstruation.** In most cases the earliest indication that conception has occurred is the missing of a menstrual period. In a healthy and normal married woman this symptom by itself is very suggestive of pregnancy. A second missed period makes the evidence still stronger. Most women do not hesitate to diagnose their condition from this alone before any other evidence appears, and they are generally right.

At the same time, we must realize that there is a chance of being mistaken if we rely entirely upon this one symptom. Other things beside pregnancy can cause the menstrual periods to be absent for a longer or shorter time. This may happen, for example, when a patient is "run down" and in poor general condition, or when she has such a disease as anaemia or early lung-trouble. Another possible cause is travel, or change of residence and climate. Absence of menstruation is also a common symptom of underactivity on the part of the so-called ductless glands, particularly the ovaries and the thyroid. One or more periods may be skipped as a result of nervous or emotional strain; this sometimes occurs just after marriage, or when the thoughts are concentrated upon the possibility of pregnancy.

In any case a woman who has missed a menstrual period ought to consult her physician promptly. If she is pregnant, the sooner she puts herself under his care the better. If the cause of the symptom is not pregnancy, then her case obviously requires investigation, and perhaps treatment.

There is a further chance of mistake if we reckon entirely by the menstruation, because of the fact that occasionally, though not often, a patient may have one or two periods after she has conceived. When this happens the bleeding is generally scanty or otherwise unusual, and is frequently indeed not a true menstrual flow at all, but the result of some abnormal condition.

We should remember, too, that it is possible for a woman to become pregnant at a time when her periods are already absent—for example, while she is nursing.

So we see that there is no *necessary* connection between conception and the stopping of menstruation, since each can happen without the other. Nevertheless, the first symptom of pregnancy is nearly always a missed period, and hence this is an indication to which the healthy wife

who has been previously regular may rightly attach great importance.

**Changes in the Breasts.** Nature's wise plan provides that the baby shall receive his nourishment from the mother for several months after birth, as well as during the nine months while he is developing within her body. The changes in the breasts which prepare them to carry out their important function of nursing begin very shortly after conception occurs. Some evidence of these changes can soon be detected by the patient, as well as by her physician.

About the fourth week of pregnancy—that is, some time between the first and the second missed periods—most women notice that their breasts begin to seem firmer, tighter, or fuller than before, even though there may be as yet no obvious enlargement. This sensation is often accompanied by feelings of tingling, throbbing, or pricking. Occasionally the breasts become very tender, so that the slightest pressure is uncomfortable.

By the end of another month there are usually more pronounced changes. The breasts increase in size, and begin to feel nodular, or "knotty," to the touch. This is due to the rapidly growing milk-glands, which are grouped in clusters or bunches. As growth goes on more blood comes to the breasts, and the enlarged surface-veins can be seen forming a delicate blue net-work just underneath the skin.

At the same time the nipples grow larger, more prominent, and somewhat darker in color. They have been described as becoming "more healthy looking." The *areola*, or pigmented circle around the nipple, increases in width and becomes darker. Sometimes a less distinct outer circle, or secondary *areola*, appears. The increase of pigmentation in the nipple and *areola* is always more marked

in brunettes than in blondes. There may be a number of little rounded elevations scattered throughout the areola; they are the tiny oil-glands of the skin which have enlarged and become more prominent.

The most important evidence of pregnancy to be seen in the breasts is a thin discharge from the nipples; it is not true milk, but a watery fluid called *colostrum*. This may appear as early as the third month, though usually it comes somewhat later. It is often first noticed by the patient as it dries upon and stains the linen.

Many women believe that it is impossible for them to become pregnant again while they are nursing a baby, particularly if their monthly periods are still absent. This belief is incorrect; while conception is perhaps somewhat less likely at such a time, it is by no means impossible. The practice of unduly prolonging the nursing in the hope of avoiding another pregnancy is not only a source of harm to both mother and child, but often fails to accomplish its purpose.

When pregnancy does occur during nursing, it is, of course, not indicated by the usual and obvious changes in the breasts. There generally are breast-changes, however, affecting the milk, which is likely to become scant in amount and poor in quality. The first evidence in such cases is often the behavior of the nursing baby. He may refuse the breast altogether; or if he continues to nurse he frequently stops gaining in weight and becomes fretful and colicky; his digestion may be so upset that immediate weaning is necessary.

Typical changes in the breasts very rarely come from any cause other than pregnancy. Their value in diagnosis is especially great in first pregnancies, and they are fairly reliable if a woman has not had a baby for two years or more. In patients who have been pregnant or have nursed

recently, however, it is often difficult to say whether conditions in the breasts are due to the changes which took place at a previous time, or whether they are new developments. In a first pregnancy, at all events, the breast-symptoms are most significant. If a woman has missed one or more menstrual periods and notices in her breasts the changes here described, particularly a moist discharge from the nipples, she may safely begin to plan for the coming of a baby.

**Stomach Disturbances.** The *morning sickness* of early pregnancy is a well-known symptom. As the name suggests, it usually occurs in the early part of the day, often when the patient starts to arise in the morning, and passes off as the day goes on. There is a feeling of nausea and distaste for food, sometimes accompanied by vomiting. This symptom begins about the third or fourth week of pregnancy and lasts for eight or ten weeks, after which it normally subsides.

About one-third of pregnant women escape such disturbances altogether. Another third experience them in a mild form, while the remaining third may have considerable annoyance of this sort. Morning sickness is rather more likely to occur in a first pregnancy than in subsequent ones, and is more frequent in women who are nervous and highly-strung than in those of calm and phlegmatic temperament.

Along with the upset stomach may go a marked loss of appetite. The patient occasionally develops cravings for special or unusual articles of food. Sometimes there is a greatly increased flow of saliva, which is annoying rather than serious; the frothy expectoration has been called "cotton splitting."

A moderate amount of stomach disturbance is not abnormal during the second and third months. But if such

symptoms become too severe, as would be the case with repeated attacks of vomiting all through the day, or if they persist much beyond the end of the third month, they call for investigation and treatment by the doctor.

Stomach upsets may, of course, result from many other causes besides pregnancy, and moreover they are absent, as we have said, in a fair number of pregnant women. Therefore such symptoms by themselves cannot be regarded as very conclusive evidence, although occasionally they may be the first available indication of early pregnancy, as in the case of a nursing mother who conceives again. Ordinarily morning sickness helps us to make the diagnosis only when we consider it together with the other typical early symptoms.

**Irritability of the Bladder.** As we saw in Chapter II, the womb lies behind and above the bladder, and usually rests lightly against it. From the beginning of pregnancy not only does the womb grow larger and more "top-heavy," but also in most cases it bends somewhat more sharply forward. This causes it to press and to pull upon the bladder, and results in certain urinary symptoms noticed by perhaps four women out of every five.

These symptoms begin about the fourth week. The feeling that the bladder is full and the desire to empty it occur with great frequency, even though the amount of urine present is small. In some cases the urge to pass water becomes very strong, and a few drops may even escape involuntarily during coughing, sneezing, or other muscular effort.

Such symptoms in early pregnancy are not the result of changes in the urine, or of kidney trouble, though many women interpret them so. The doctor makes repeated examinations of the urine throughout pregnancy in order to be sure that it remains normal and that the kidneys do

their work properly, and in the great majority of cases everything is found to be satisfactory. The urinary symptoms may be due in part to nervousness, or in part to congestion of the pelvic organs, but they are mainly mechanical in origin, resulting from the pressure and the pulling of the enlarged and heavy womb upon the bladder. They usually disappear about the fourth month because the womb, as it continues to grow, rises up into the abdomen, and so the pressure on the bladder is relieved.

In occasional cases the position of the growing womb is such that it presses against the outlet, or neck, of the bladder. Symptoms then do not occur, as a rule, during the first two months, but in the third or fourth month there is difficulty in passing water, particularly in starting the stream, and if the bladder becomes distended there may be some involuntary dribbling. Such happenings should at once be brought to the notice of the doctor, who can easily discover and correct the trouble.

Urinary symptoms by themselves are not of great value in the recognition of early pregnancy, since on the one hand they can come from a variety of causes, and on the other they are absent in about one out of every five pregnant patients. Taken in conjunction with the other early symptoms, however, they help to confirm the diagnosis, and the reason for their occurrence is easily understood.

#### THE EARLY SIGNS

Every careful physician wishes to make a thorough examination of his patient early in pregnancy. This is most important, and should never be omitted. A *general* examination gives the reassuring information that the heart, lungs, and kidneys are healthy and able to perform their functions normally. The *local*, or *vaginal*, examination is of no less importance; by it the doctor ascertains that the

position of the womb is correct, that there are no abnormal conditions within the pelvis, and that the mother's bones are of proper size and shape. He also finds on local examination certain evidences or signs which help to establish the diagnosis of early pregnancy.

These signs cannot, of course, be detected by the patient herself, but it may be of interest to the reader to know in a general way what they are.

Changes in the womb occur from the very beginning of pregnancy, and can soon be discerned by the doctor. The organ grows larger and rounder, and usually bends more forward; it also changes in consistency, and becomes generally softer.

A change in color of the membrane lining the vagina is seen in most cases. This is ordinarily pink, but turns bluish or purplish as the blood-supply to the parts increases and the veins become full.

Some of the changes in the breasts can be detected by the physician before they are obvious to the patient. He may be able, for example, to show by gentle manipulation that the breasts contain some fluid, and in a first pregnancy, at all events, this would be very important evidence.

We can sum up the matter of early symptoms and signs by saying that, while they are never absolutely conclusive, in ordinary cases they are definite enough so that by the end of the fourth week of pregnancy—that is, before a second period is missed—there is seldom any question about the diagnosis.

#### THE LATER SYMPTOMS

The absence of menstruation continues throughout pregnancy. Any bleeding which occurs after a patient knows that she is pregnant is distinctly abnormal, and should be reported to the doctor at once.

**Changes in the breasts** become more marked. As time goes on there is usually, though not always, an increased secretion of colostrum, which becomes thicker and yellower and more like milk. The breasts grow large and heavy, and may need to be supported by a light binder. Sometimes they are so tense that their skin is very tightly stretched, and this results in the appearance of pinkish lines or stripes, known as *striae*, which are really small scars in the deeper parts of the skin, due to the stretching. Occasionally the nipples are sore and very tender, or they may be flat or retracted; such conditions must be treated and corrected before the baby comes.

As regards **stomach disturbances**, the typical morning sickness subsides in most cases about the end of the third month. Other changes or mild disorders in the digestive organs are very common throughout pregnancy.

The majority of prospective mothers are troubled more or less by *constipation*. This is due partly to the pressure of the womb on the lower bowel, and partly also to a combination of other causes such as sedentary habits of life and poor tone in the stretched abdominal muscles.

*Indigestion* is a fairly common symptom, and may manifest itself in any of several forms—heartburn, sour stomach, gas, or pain. Distress of this sort can in most cases be greatly helped by medical treatment.

The *appetite*, which is inclined to be uncertain during the early months while the patient is troubled with nausea, improves as pregnancy goes on, and sometimes becomes ravenous toward the end. There may be a strong desire for certain special articles of diet, even for peculiar or unusual things.

The *mother's weight* generally increases somewhat during pregnancy. At full term the baby, the waters, and the placenta weigh all together in the neighborhood of eleven

pounds; but quite apart from that, the mother's own body at the end of pregnancy is on the average about one-thirteenth heavier than it was at the beginning. This increase, which takes place mainly during the last few weeks, is due in large measure to the mother storing up the necessary elements of food which will supply strength when the baby is born, and nourishment during the period of nursing.

The *teeth* of the pregnant woman are rather prone to become soft and decay, so that toothache is not an uncommon symptom. One reason for such changes in the mother's teeth may be that she is called upon, especially during the last five months, to supply a large amount of mineral matter for the baby's bones. Dental attention at frequent intervals throughout pregnancy will prevent much trouble. The old saying "for every child a tooth" applies only when this important matter is neglected.

The **irritability of the bladder** which is so often a symptom of early pregnancy seldom lasts beyond the third or fourth month. As the growing womb rises up into the abdomen and begins to be supported to some extent by the abdominal wall it no longer rests upon the top of the bladder, and so the mechanical irritation of that organ is relieved.

Toward the end of pregnancy there is usually some return of the bladder-symptoms. Two or three weeks before the baby is born the womb normally sinks or drops in position, so that the bladder is compressed by the baby's head. As a result the patient feels the desire to pass her water very frequently, and may even be unable to hold it. These symptoms disappear, of course, as soon as pregnancy is over.

**Quickening** is the name given to the first conscious feeling or perception by the mother of her baby's active movements in the womb. This ordinarily occurs between the sixteenth and twentieth weeks, the eighteenth week being

about the average time. Women usually quicken a little earlier in subsequent pregnancies than in the first, because their previous experience makes them familiar with the symptom and enables them to detect it promptly at its first appearance.

The sensation in the beginning is variously described as tapping, a quivering, or a fluttering like that of the wings of a bird imprisoned in the hand. The feeling is quite distinctive, and patients who have once experienced it will seldom fail to recognize it again. Occasionally the movement of gas in the bowels is mistaken for quickening, but this is not likely to happen if a woman knows the real sensation produced by a baby moving in the womb.

At first the baby's movements are felt at long intervals, perhaps half-a-dozen times in the course of a day. As pregnancy goes on, however, they increase in frequency and in vigor. During the latter months some babies are very lively, moving almost constantly and delivering sharp blows and kicks. This activity is sometimes so great as to be distinctly annoying, and even to interfere with the mother's sleep. It is generally increased by cold and by activity on the mother's part, and is diminished by the opposite conditions. On the other hand, some babies go for long periods without making their movements felt at all.

The word *quicken* means *coming to life*, and it was formerly believed that the baby was not an independent living being until this symptom appeared. Of course, we know now that such an idea was entirely wrong. The baby has a life of its own from the moment of conception; this is not only scientifically established, but is recognized from the moral and legal view-points as well.

As a matter of fact, the baby moves actively long before the time of quickening. In the early months, however, his movements are so gentle that the mother cannot feel them.

Toward the middle of pregnancy they become much more vigorous, and that fact is one reason for the occurrence of the symptom. Another reason is that the growing womb comes to lie in contact with the front wall of the abdomen, to which impulses from within the organ are transmitted.

**Enlargement of the abdomen** begins to be evident by the middle or end of the fourth month. Oftentimes a woman first notices that her clothes seem to fit more tightly than usual around the waist. As the months go on the enlargement increases steadily and rapidly. Some women show their condition more than others, not so much because babies vary in size as because mothers differ in build and in the degree of support given by their abdominal muscles.

When the womb has become heavy and the abdomen is large, the whole body-balance is likely to be altered, and the mother's gait and carriage are sometimes noticeably affected. Changes in the posture of her body may throw enough strain upon the muscles and ligaments to cause backaches, shoulder-pains, and other similar discomforts.

The skin of the abdominal wall is considerably stretched during the latter part of pregnancy. Very commonly striae appear, similar to those described in the breasts. These pinkish or bluish stripes, the scars of minute tears which result from the stretching of the deeper parts of the skin, subsequently fade and become the permanent white markings so often seen on the abdomens of women who have borne children. No trouble is ever caused by them.

The stretching of the abdominal skin causes the navel to become shallower, until by the end of the seventh month it is no longer a depression, but is flat and level with the surrounding surface. During the last two months it may even protrude or "pout."

Two or three weeks before the end of pregnancy there ordinarily occurs what is known among women as *dropping*

or *settling*, and in medical language as *lightening*. The womb drops downward and somewhat forward, so that the contour of the abdomen is changed, and the baby is no longer "carried high." The lower part of the womb, which usually contains the baby's head, sinks into the true pelvis, and hence lightening is a good indication, because it shows that there is plenty of room for the head to pass through the mother's bony parts. Lightening occurs earlier in first pregnancies than in later ones, and is favored if the mother has strong abdominal muscles.

**Pressure symptoms** naturally manifest themselves as the womb increases in size and crowds the other organs. We have already discussed the results of such pressure on the bladder, and also on the bowels.

Pressure on the great blood-vessels may cause enlarged or *varicose* veins. These are most commonly seen in the legs, but they may appear on the vulva, or around the lower end of the bowel. Varicosities in this last region are known as *haemorrhoids*, or piles, and are very often associated with constipation in pregnant women.

Swelling of the feet and ankles is another fairly common result of the womb pressing on the large veins. This symptom need cause no worry so long as it is known to be produced by pressure, but the doctor should always have an opportunity of making sure that it is not an indication of kidney-trouble, as is sometimes the case.

Pressure on the large nerve-trunks may during the last few months give rise in the legs to neuralgic pains, or to feelings of tingling or numbness.

Toward the end of pregnancy a great many women are troubled more or less by shortness of breath, often worse when a patient lies down. The large womb filling the abdomen interferes with the movements of the diaphragm, and so hinders free breathing. This symptom becomes less

annoying when lightening occurs and the womb sinks lower. In all cases in which shortness of breath is troublesome, particularly if it should appear before the last two months of pregnancy, a thorough examination of the heart, lungs, and kidneys is necessary in order to be certain that the cause of the symptom is not some disease of these organs.

**Leucorrhœa**, a white or yellowish discharge from the vagina, is not uncommon during the latter part of pregnancy. It is caused, or aggravated when already present, by the marked congestion of the organs. If the discharge is profuse, or if it produces swelling, burning, or general discomfort in the external parts, it should receive appropriate treatment under the direction of the doctor.

**Skin changes** occur to a greater or less extent in the majority of pregnant women. The most frequent change is *an increased amount of coloring matter*, or pigment, limited usually to certain special regions of the body. We have already seen that this regularly appears in the nipples and their surrounding areolæ. It is also very common to find a broad pigmented line running up and down the middle of the abdomen, most conspicuous around and below the navel. Sometimes large irregular yellow or brownish blotches develop on the face, producing what is called the "mask of pregnancy." Such pigmentation for the most part disappears after pregnancy is over. These changes are always more marked in brunettes than in blondes.

The *striae* which occur frequently in the skin of the abdomen and of the breasts have already been described. Similar scars are sometimes seen on the thighs, and in any region where the skin is stretched.

**Rashes** and *eruptions* occasionally develop in connection with pregnancy. They are transient, as a rule, and are not troublesome except perhaps on the ground of looks.

**Itching** may be a very annoying symptom. When it

affects the whole body it is usually of nervous origin, and the same may be true when it is limited to the vulva. In the latter case, however, there are other possible causes, such as congestion, the irritation of a leucorrhœal discharge, or abnormalities of the urine. Severe or persistent itching ought not to be neglected; the cause of it should be discovered and removed.

**Nervous and mental symptoms** are present in a certain number of cases. There may be a change in the disposition; a few patients become temporarily gloomy and despondent for no real reason, while many others are more buoyant and happy than ever before. Lassitude and excessive sleepiness sometimes occur. Dizziness, feelings of weakness, and attacks of faintness may any or all of them be annoying, but are not to be regarded as serious symptoms provided the doctor's examination shows that the patient is generally healthy and free from any organic disease.

#### THE LATER SIGNS

Some of the symptoms just described, like enlargement of the abdomen and changes in the skin, may also be regarded as signs, since they are just as obvious to the doctor when he makes his examination as they are to the patient. In addition, there are other signs, mostly of a very definite and unmistakable character, which the physician expects to find during the last few months of pregnancy.

**Changes in the womb** are naturally among the most conspicuous of these signs. It increases in size steadily, and with a rapidity which distinguishes it from all other abdominal masses or tumors. This growth goes on at a fairly constant rate, so that it is possible, by noting the size of the organ, to say with reasonable accuracy how far pregnancy has advanced. At the end of the third month the womb can usually be felt as a round mass in the lower part of the

abdomen, just above the pubic bones. From that time on it rises higher and higher, reaching the level of the navel about the sixth month, and the edge of the ribs during the ninth.

The consistency of the womb undergoes a marked change. In the non-pregnant state the organ is firm and hard, but during pregnancy it becomes soft, elastic, and thin-walled.

We saw in Chapter II that the womb is a muscular organ. In labor its muscular tissue contracts vigorously, and helps to push the baby out. All through pregnancy there are gentle rhythmic contractions, which can usually be detected by the doctor from the third month on. They are ordinarily not noticed by the mother, though sometimes toward the end they may be felt as "false pains." These contractions assist in maintaining a good circulation of blood in the womb, and are also of value in causing the baby to lie in a favorable position.

**Ballottement** is an important sign in the diagnosis of pregnancy, and can be obtained as early as the fourth month. The reader learned in Chapter III that the developing baby floats in a surrounding fluid. Now, if a gentle push is given against the womb by the examiner's finger, it is possible after a few seconds to feel the rebound of the baby within the womb, in much the same way as a small piece of ice floating in water slowly comes back against the finger after a sudden push has caused it to sink below the surface.

The active movements of the baby can be felt by the doctor almost as soon as quickening is experienced by the mother, and give us one of the so-called *positive signs* of pregnancy. The doctor, moreover, is much less likely than the mother to be deceived by other confusing things such as the movement of gas in the bowels.

It is possible to feel and outline the different parts of the

**baby** during the latter half of pregnancy, and very easily indeed during the last two or three months. Not only is this a positive sign, but it also affords definite information about the position in which the baby is lying.

**Hearing the baby's heart-beats** is another positive sign of pregnancy. From the fifth month on there is usually no difficulty in obtaining this evidence. With a stethoscope on the mother's abdomen, a sound is heard much like the muffled ticking of a watch under a pillow. The rate of the heart-beat can be counted, and is usually found to be between 120 and 150 to the minute, or nearly twice as fast as the pulse of an adult person.

**The x-ray** will show the presence of a baby in the womb during the second half of pregnancy. It gives very uncertain evidence in the first four or five months, however, because during that early period the baby's skeleton does not contain enough mineral matter to show in an x-ray picture, and the baby's soft parts cannot be distinguished from those of the mother. Since toward the end of pregnancy the diagnosis is usually settled beyond doubt by the symptoms and other signs, there is seldom any additional information to be gained from the use of the x-ray.

**Enlargement of the mother's thyroid gland** is very common during the last three months, and within certain limits is normal. This organ, situated in the front of the neck just above the top of the breast-bone, is one of the ductless glands, or glands of internal secretion; when it is abnormally enlarged or overactive, it becomes what is known as a goitre. We do not clearly understand the influence which the thyroid has upon pregnancy, but in all probability it helps the mother's body to meet the extra strain, and at the same time regulates to some extent the growth and development of the baby.

## CHAPTER V

### THE PREDICTION OF THE BABY'S BIRTHDAY, AND CERTAIN OTHER PREDICTIONS

As soon as a young woman knows that she is going to have a baby, several very interesting questions at once arise in her mind. First of all, she naturally wants to find out when the baby may be expected to arrive. Then there is the momentous question whether it will be a boy or a girl. She wonders, too, which parent the child will "take after," and how far it is possible to foresee its mental or physical traits. An event so important as the coming of a baby has always been the basis for these and other interesting speculations. Let us see how much information the doctor can give in answer to such questions.

#### THE BABY'S BIRTHDAY

It would be very convenient for all concerned if we knew how to foretell exactly the day on which the baby is going to be born. There are two reasons, unfortunately, why this cannot be done.

In the first place, we never know the exact time when conception occurs. It is true that in some cases the date of the fruitful intercourse is known, but that cannot be regarded as the starting-point of pregnancy, since the actual conception, or fertilization of the egg-cell, often does not take place until several days later.

Furthermore, the duration of pregnancy is not the same in all cases. We know that it is *about* forty weeks, or nine calendar months, but it may vary and be shortened or

prolonged by as much as two or three weeks under entirely normal conditions. So, since no one ever knows exactly when pregnancy began, or exactly how long it is going to last, it is obviously impossible to say exactly when it will end.

For practical purposes, however, we can make a fairly accurate estimate. This is based upon the assumption that pregnancy can be dated from the last menstrual period, and that the baby will be born about 280 days from the beginning of that period. Of course, this is only an average figure, but it gives results as reliable as can be obtained by any method of reckoning which we have.

It would be a laborious process to count forward by days up to 280, and so we use a short cut in making our calculation. We can regard nine calendar months as the equivalent of 273 days; sometimes, since the months are not equal, they total up to a day or so more, but this can be disregarded, for there is no use in trying to be too accurate in a calculation which is only approximate at best. So, if we count ahead nine calendar months and seven days, we shall cover a total of 280 days. Counting back three months brings us to the same point in the calendar as counting ahead nine, and is even easier. Therefore the rule which we ordinarily use for reckoning the date of confinement is as follows:

- (1) Take the first day of the last menstrual period.
- (2) Count back three months.
- (3) Add seven days.

For example, let us suppose that the last menstrual period began on June tenth. Counting back three months brings us to March tenth, and adding seven days gives March seventeenth, which (in the following year, of course) will be the estimated date of confinement.

Only a small proportion of babies arrive on the exact day which is figured out by this method. The great major-

ity, however, are born within a week or two on one side or the other of that date. So, while we cannot foretell the precise day of the baby's birth, any more than we can the hour and the minute, the date upon which we reckon is not likely to be very far from the actual time of the great event.

Occasionally a patient goes two, three, or even four weeks beyond the expected date. While delay and waiting are tedious, there is usually no occasion for worry in these cases. The explanation, as a rule, is that conception actually took place two or three weeks later than was supposed, and therefore the fault is with the calculation, not with the patient. We must remember, too, that the duration of pregnancy varies, and in perfectly normal cases is often somewhat longer than the average. Only very rarely can a patient be considered really overdue in an abnormal way. The doctor recognizes unusual cases of this sort by noting the size of the baby.

It is not at all uncommon for the baby to arrive a week or even two before the calculated date, since some pregnancies are normally shorter than others. But if the birth occurs as much as three or four weeks ahead of the expected time, it usually means that pregnancy has ended prematurely.

Sometimes we are not able to reckon the date of confinement in the ordinary manner, because the date of the last menstruation is not available. This might happen, for example, if a nursing mother became pregnant again while her periods were still absent. In such cases there are other means of calculation that can be used, though they are none of them accurate.

If the date of the fruitful intercourse is known, we can calculate from that. The baby will be born 269 days later on the average, though many normal cases vary as much as a week or two from this average figure. To reckon 269

days from a given date, we count back three calendar months, and then back four days more.

We saw in Chapter IV that quickening, or the mother's first perception of the movements of her baby, usually occurs about the eighteenth week of pregnancy. Since the average length of pregnancy is forty weeks, we shall come reasonably close to the date of confinement in most cases if we count ahead twenty-two weeks from the time of quickening.

The doctor is able to estimate how far pregnancy has progressed, and so how long it has yet to continue, by observing the size of the womb, which enlarges at a fairly constant rate. At the end of the twelfth week it can usually just be felt in the lower part of the abdomen; at the end of the twenty-fourth it reaches the level of the navel; by the thirty-sixth week it has risen as high as the ribs; and during the last three or four weeks of pregnancy it increases further in size, but drops considerably in position as the baby's head enters the pelvis. From these and other signs the doctor can usually predict within two or three weeks the date when the baby will be born.

#### BOY OR GIRL?

A normal healthy baby of either sex will make most parents very happy. It is quite reasonable, however, that people should have their preferences one way or the other, as they often do. With the necessity of choosing a name and making other plans for the future, the prospective parents naturally feel a great interest in the question whether the new arrival will be a son or a daughter. The very uncertainty of this makes it all the more fascinating to think about.

For centuries the sex of the unborn child has been the subject of much thought and attention. There are really

two problems which arise in this connection. First, is it possible in any way to *predetermine* sex—that is, to control voluntarily the sex of the coming baby, so as to have a boy or a girl as one chooses. The second problem is much less ambitious: leaving aside all question of voluntary control, is it possible to *predict* or foretell the sex of the baby during pregnancy.

**Predetermination of Sex.** From the most ancient times people have been trying to discover a method by which either sex could be produced at will. Great scientists have worked upon the problem, and books have been written about it. Literally hundreds of different schemes have been proposed and tried, but they have all one after another proved unsuccessful and been abandoned. One of the most famous theories was that of a well-known Vienna doctor, who announced about twenty-five years ago that the sex of the child could be controlled by regulating the mother's diet during pregnancy. He was twice called to attend the Czarina of Russia in order that a male heir to the throne might be born, and each time the result was a daughter. Ultimately the Czarina gave birth to the hoped-for son two years after this physician's death. So it has been with all the numerous attempts to accomplish what we now know to be impossible.

If very young embryos are examined, there is no way to distinguish those that are going to be males from the future females; the differentiation of sex, so called, does not become obvious until the embryo has been developing for some weeks. Nevertheless it is practically certain, in the light of present scientific knowledge, that the future sex of the baby is really determined at the moment of conception. There are probably two kinds of spermatozoa, capable of producing male and female offspring respectively, and millions of each sort in approximately equal numbers are contributed by

the father at the time of the marital relation. As we have seen, only *one* spermatozoön enters the egg-cell to fertilize it, and the rest are wasted. It appears to be a matter of absolute chance which sort of spermatozoön accomplishes the fertilization of the egg-cell, but once that fertilization has taken place, the sex of the child is determined for all time. Nothing that the mother does during pregnancy can influence it in the slightest. There is no way in which it can be controlled at the time of the marital relation. And so far as we know, it is impossible for the father to affect in any way the proportions of the two sorts of germ-cells which he produces.

Why some families have several children of one sex and none of the other, we do not know. The theory of probability explains the most remarkable "runs" and sequences in the various games of chance, and it may be that there is no other reason to account for the unusual combinations of boys or girls that occur in certain families.

The whole subject is an interesting one, and the possibility of producing sons or daughters according to choice has always been very attractive. The more we learn about it, however, the clearer it becomes that this can never be done, and that the result depends upon a chance which is entirely beyond human control.

**Prediction of Sex.** The doctor is often asked if he can tell whether the baby will be a boy or a girl. Though countless attempts have been made to find an accurate way of foretelling sex, no method which is in the least reliable has yet been discovered. The chances in any case are somewhat in favor of a boy, since statistics show that 105 boys are born to every 100 girls. Along toward the latter part of pregnancy the doctor may be able to form some opinion from the size of the baby and the rate of its heart-beat. Boy babies are in general slightly larger than

girls, and their hearts are said to beat on the average at a slower rate. At best, however, such evidence is not conclusive, and must often be misleading.

One hears of all sorts of wonderful rules and formulas which unscientific people use for the predicting of sex. Each of these has its supporters who assert that it has never been known to fail. When we reflect, however, that any method, even the tossing of a coin, would give correct results in about 50 per cent of cases, and that success is long remembered while failure is soon forgotten, it is easy to see how these unscientific methods may gain credit. One physician, long since dead, used to ask each pregnant patient whether she wanted a boy or a girl. When she told him, he made a note with much formality in a small memorandum book. If her hopes were fulfilled, he was able to claim credit for arranging things satisfactorily. If the child proved to be of the opposite sex, he showed her his book, in which it was recorded that such would be the case!

However great the uncertainty about the sex of the unborn child may be, it has the merit, unlike some other uncertainties, of being temporary only, for an answer to the question is sure, and will never be long delayed.

#### TWINS

Twins occur, on the average, about once in ninety pregnancies. They are more frequent in certain countries—for example, in Ireland and Russia. The tendency to twin births runs in families, and is especially likely to be continued by a mother who is herself a twin. If both mother and father are members of families which show this tendency, the chances are very good that they will produce twin offspring.

Once in 8,000 pregnancies triplets are born. Four, five,

and even six babies at one time (quadruplets, quintuplets, and sextuplets) have all been recorded, but are exceedingly rare. There is no authentic case of more than six children at a pregnancy, though ancient folk-lore contains many such fabulous tales. The Countess Hagenau, for example, is reported to have given birth on one occasion to 365 embryos!

We distinguish two sorts of twins, depending upon the manner of their origin. These are known as *double-ovum* and *single-ovum* twins.

In the case of double-ovum twins, each baby develops from a separate egg-cell or ovum. For some reason two ripe egg-cells happen to be produced by the mother at the same time, and each becomes fertilized by a separate spermatozoon. The two babies develop independently, and each has its own placenta.

Double-ovum twins are the commoner variety, occurring about four times as often as the other sort. Their sex is entirely a matter of chance; two boys, two girls, or a boy and a girl are all possible. When such children grow up, they do not necessarily bear any more resemblance to each other than is usual among brothers and sisters who are not twins.

Single-ovum twins, on the other hand, come from one egg-cell fertilized by one spermatozoon. Exactly why this cell goes on to produce two babies, instead of one, nobody knows. Perhaps the cell is similar in some way to a hen's egg with a double yolk. These twins develop independently, but are attached in the womb to a single placenta.

Of all twins, the single-ovum variety constitute about one-fifth. The two babies are always of the same sex; two boys or two girls occur with about equal frequency. Twins of this type resemble each other very closely, so much so that in childhood they sometimes cannot be told

apart except by their mother; in fact, they are known in scientific language as *identical* twins.

A twin is likely to be smaller than the average single baby, though a pair together will in most cases weigh considerably more. Often there is some difference in size and weight between the two twins of a pair, even of the single-ovum variety. It is not uncommon for twin-pregnancies to end a little before the ordinary full term.

We have no way, of course, of favoring or preventing the conception of twins. Their presence can usually be recognized by the doctor during the latter part of pregnancy. The size of the mother's abdomen is not by itself a reliable sign, but a careful examination will in most cases show whether or not two babies are to be expected.

### HEREDITY

We learned in Chapter III that *conception* is the union of a male sex-cell, a spermatozoon, with a female sex-cell, an egg or ovum. This is what doctors call fertilization, and the result is a single cell, a fertilized ovum, which is the beginning of a new individual.

Now, there is no very obvious difference between the fertilized ovum of the human species, and that of the cat, the dog, or any other animal. Each is a minute cell, a mere speck of protoplasm containing a nucleus, and it would be very difficult, if not impossible, to tell one from another even with the aid of the microscope.

And yet the human ovum develops by a very complex and elaborate process into a baby, while the cat's ovum, by a process equally complex but different in many details, develops into a kitten. There is never any mistake in the way this works out. Men do not gather grapes of thorns, or figs of thistles. It is absolutely certain that, if the fertilized ovum completes its development, the result will be a new individual of the same species as the parents.

We must conclude that there are certain inherent qualities in the fertilized ovum which are perhaps not in the least obvious, but nevertheless control and profoundly influence the lines along which that ovum is going to develop. These qualities determine not only the species of the new being, but also his race and many of his individual characteristics.

No two species or races of living things are similar in all details, and no two people in the world are exactly alike. Each person is distinguished, by certain traits of body and mind, from all others. The numerous peculiarities of an individual are the result partly of *heredity*, and partly of *environment*.

By environment we mean the sum total of circumstances which surround the individual's life from the time of conception on. Everyone knows that both mental and bodily characteristics may be strongly influenced for better or worse by the circumstances under which a person lives. Environment is always more or less under our control.

By heredity we mean the sum total of qualities present in the fertilized ovum which will modify and direct the individual in the course of his development, and will determine his species, his race, and many of his own particular traits and characteristics. A person's heredity is absolutely fixed at the moment of conception, and cannot be altered.

We have seen that every cell has a *nucleus*, and that the nucleus contains several masses of a dark-staining material called *chromatin*. Now, this chromatin material is known to be the part of the cell which bears or carries all hereditary characteristics.

The chromatin in the nucleus of the fertilized ovum comes from two sources. Part of it was present in the ovum before fertilization, and that is the mother's contribution. An equal part belonged to the *spermatozoon*, and is the

contribution of the father. Thus the new individual starts out endowed with characteristics which he has inherited from his two parents, and they in turn from their parents, and so on back through the whole line of ancestors.

The only characteristics that can be inherited are those *inherent* in the race or line. Unless a trait is carried by the chromatin material in the sex-cells of one or both parents and was received by them from their parents, it cannot be passed on by heredity to their offspring.

It is not necessary that *all* the inherent traits of a line or family should come to the surface and show themselves in every member of every generation. Frequently some special trait appears to skip two or three generations, and then crops out in the third or fourth. As a matter of fact, it has never really skipped at all in such cases, because it has been transmitted by the chromatin of the sex-cells from each generation to the next. Those members of the line who themselves did not show that trait nevertheless possessed it in a concealed or latent form, and were able to pass it on to their descendants.

So it is possible for even very marked traits in the parents to be absent, as far as one can see, from the child. And it is equally possible for hereditary traits to appear in the child which were not at all obvious in the parents, though they may have been conspicuous in the grandparents or some more remote ancestors.

Sometimes it happens that one or another inherent characteristic is eliminated from the chromatin material of the sex-cells, and so fails entirely to be transmitted to the next generation. In this way an hereditary trait may die out, never to reappear in any future member of the line.

No trait can be inherited which is not inherent in the stock. Characteristics acquired by a person as a result of his environment are not transmitted to his offspring. For

example, if a man loses a leg in an accident, there is not the slightest danger that subsequently his children will be born without legs.

The characteristics that can be inherited include those which belong in general to the species and the race, and those which belong particularly to the immediate line or family. The general characteristics of species and race, being very deeply rooted, are always inherited. Familial characteristics are more uncertain, and the infinite variety of combinations in which they may be transmitted accounts for the fact that every individual is different in his own particular personal make-up from all others of the same race.

**Inheritance of Physical Traits.** The general bodily characteristics of the species and the race will certainly appear in every new individual. Human parents always produce human babies. The skin of the Negro, the features of the Chinaman, and the stature of the Bushman will never fail to be inherited by their respective offspring.

There is much less certainty about the inheritance of physical traits that belong particularly to families or individuals. We realize this at once when we think how much difference in appearance there often is between two children of the same parents.

The group of physical traits which can be transmitted by heredity includes complexion, color of the eyes, details of face and features, tall or short stature, tendency to long life, resistance to disease, and certain rather rare deformities such as extra fingers and toes.

The likelihood of any trait like these being transmitted to the new baby depends upon how strongly it is inherent in the stock or line. If it shows itself in both parents, there is a good chance that it will be passed on; this becomes even more likely if the trait has appeared in several members of both the mother's and the father's families.

When two individuals are mated who both have some hereditary characteristic strongly developed, that characteristic is likely to be intensified in their descendants. This often works out by chance in human beings, but circumstances prevent our deliberately applying the principle to practical use in the case of our own species. In the breeding of animals, however, and in such work as Luther Burbank has done with plants it is possible actually to produce new varieties by a system of selective breeding which causes certain traits to become prominent and others to disappear.

While our knowledge of the whole subject of heredity is still very incomplete, it has grown considerably during the last few years. Some day we may be able to foretell accurately all the important characteristics which a child will receive by inheritance. It is possible now to make fairly accurate predictions in regard to some traits, as for example the color of the eyes.

Scientists tell us that people with brown eyes really fall into two groups, although as far as ordinary appearances go there is no way of telling the two apart. The sex-cells of one group carry the brown-eyed trait alone in a pure or unmixed form. This is the case among the Italians, and is likely to be true of any individual who comes of a uniformly brown-eyed stock. People of the other group, while their own eyes are no less brown, nevertheless carry in their sex-cells a certain proportion of the blue-eyed trait, and are able to transmit it to their descendants. Any brown-eyed person one of whose parents has blue eyes would be an example of this second group.

In the case of the two brown-eyed parents, if either of them belongs to the first of the above groups, all the children will have brown eyes; but if both parents fall into the second group, an average of one in four of their children will have blue eyes, and the rest brown.

When one parent has blue eyes and the other brown, all the children will have brown eyes if the brown-eyed parent belongs to the first group; but if that parent is of the second group, then half of the children will have brown eyes and the other half blue.

Two blue-eyed parents, on the other hand, will always produce blue-eyed children and never brown, since all blue-eyed people possess that trait in the unmixed or pure form.

**Inheritance of Mental Traits.** It is common for children to resemble their parents in thought and action, disposition and character. Much of this resemblance is the result of environment, since the children are constantly with their fathers and mothers, and are natural imitators. To some extent, however, traits of mind and character can be inherited.

If the family-stock of both parents is conspicuous for intelligence, will-power, amiable disposition, or forceful personality, it is probable that the child will receive its share of these desirable qualities. Education is an acquired thing and cannot be transmitted by heredity, but excellence of mind and the capacity for learning may be inherited.

In a similar way, feeble-mindedness, weakness of character, and a lack of nervous balance are transmissible. Everyone knows that such disorders as insanity, epilepsy, and criminal tendencies sometimes run in families. The science of *eugenics* aims to eradicate these ills by preventing or regulating marriage among people who are unlikely to produce children of the best and healthiest sort.

**Inheritance of Disease.** Strictly speaking, disease cannot be inherited. There is no evidence that the chromatin material of the male and female sex-cells ever carries traits which are destined to show themselves later in the form of diseased conditions.

It is possible, however, for a *tendency* to disease, or a

diminished resistance, to be inherited. This is true, for example, in the case of tuberculosis. The child does not inherit the infection from its parents, but may receive an hereditary susceptibility to it, so that later on the disease is acquired more easily than would be the case with a normal person. The same is true, in a general way, with regard to lack of balance or weakness of the nervous system. It is fortunate that unfavorable hereditary tendencies of this sort, while they may never be entirely eliminated, can often be checked and overcome by good environment.

Diseased conditions are sometimes present at birth. This does not mean, however, that they have been inherited, in the strict sense of the word. Such diseases are called *congenital*; they are transmitted to the baby not at the time of conception, but while he is developing in the womb, and come from the mother, who may in turn have received them from the father. One of the commonest and most serious congenital diseases is syphilis.

So, although disease is not inherited as we understand that term scientifically, it is none the less important that future mothers and fathers should keep their bodies strong, clean, and healthy for the sake of the children to come.

#### THE MOTHER'S INFLUENCE ON THE UNBORN BABY

When we consider how completely the baby in the womb depends upon its mother for protection and nourishment, it is remarkable how little connection there really is between them. As we have seen, the baby is surrounded by fluid in which it floats, and its only direct attachment to the mother's uterus is by means of the slender umbilical cord. In the placenta food can pass from the mother's blood into the baby's and waste from the baby's into the mother's, but the two bloods are quite separate, and do not mingle; not a single drop of the mother's blood enters the baby's body.

Furthermore, there is no nerve connection whatever between mother and baby. Recalling these facts will help us to understand to what extent the mother can, and also how she cannot, influence her unborn child.

**Maternal Impressions.** There is a very old and widespread belief that the baby may be deformed or "marked" as the result of some unpleasant experience affecting the mother during pregnancy—a fright, a disagreeable sight, an emotional disturbance, or a mental shock. Many young women worry greatly for fear their babies will be injured in this way. The reader will now see that such worry is entirely unnecessary, since there are good scientific reasons why no state of mind on the mother's part can possibly in any way produce a blemish or defect in the baby.

Nevertheless wonderful tales of this sort are current, and probably always will be. Everyone has heard of cases where, for example, a woman was frightened by a mouse during pregnancy, and her baby when it was born had a mark "exactly like a mouse" on some part of its body.

The explanation of these cases is very simple. Probably no woman ever goes through pregnancy, or through any other period of nine months for that matter, without having at least one disagreeable experience of some sort. So, if the baby should happen to be "marked" in any way, the mother or her friends are always able to recollect an experience which in their opinion is the cause of the blemish. It usually requires a vivid imagination to detect the slightest resemblance between a birth-mark and a mouse or any other familiar object, but as a rule imagination is not lacking in such cases.

People forget that many thousands of times pregnant women have experienced the most extreme fright or grief or shock, and have nevertheless given birth to perfect and unblemished babies. As a matter of fact, though birth-

marks can now be treated satisfactorily their cause is still unknown. It is certain, however, that the mother is in no way responsible.

Some women think that they can influence the child's future character and type of mind by devoting themselves during pregnancy to religious thoughts, good literature, art or music. There is, of course, no truth in this idea. While pleasant occupations help the mother to keep happy and so may serve to promote her general health, they can have no effect on the mental make-up of the child, which will be the result partly of heredity that is settled at the time of conception, and partly of environment that comes after birth.

**The Physical Acts of the Mother.** Many people believe that the expectant mother must be careful to avoid certain actions for fear she will do direct physical harm to her baby. She is told, for example, that if she reaches up above her head she may slip the cord around the baby's neck in such a way as to choke him. Other common ideas are that she must not do any lifting, and that if she crosses her legs she will cause the baby to lie in an unfavorable position.

Such beliefs are quite without foundation. The baby is so well protected by the fluid which surrounds him that a most unusual amount of external force would be necessary to produce any bad physical effect. As regards the cord, it is undoubtedly slipped around the baby's neck and off again many times during the course of pregnancy, not because of anything the mother does, but as a result of the baby's own active movements. Sometimes it happens to be around the neck at birth, and this ordinarily causes no trouble. While violent exertion should of course be avoided by the mother, she need have no fear that the ordinary actions of everyday life will be likely to damage her baby. Normal occupations and moderate exercise are highly desirable.

**The Only Influence that Counts.** The expectant mother must try in every way to keep herself happy in mind and healthy in body. By so doing she insures three advantages for her baby: proper nourishment during pregnancy; a safe and easy birth; and the valuable care during infancy that only a normal and healthy mother will be able to give. These advantages will certainly result in the betterment of babies, and this is one of the surest and happiest predictions that we are able to make.

## CHAPTER VI

### THE EVERYDAY HYGIENE OF PREGNANCY

Hygiene is defined as the science of preserving and improving health—not of curing sickness, let it be noted, but of keeping and bettering a state of health. It primarily concerns people who are well, and if all such people paid even moderate attention to the simple laws of hygiene, the numbers of the sick would show a striking diminution. Far easier is it to keep well than to get well—not only easier but cheaper, since the first demands effort only, while the second requires effort, time, and money.

The normal pregnant woman is healthy. Invalidism should never be associated with the performance of a natural bodily function. The old saying that only by an illness of nine months does a woman escape being sick every four weeks expresses a viewpoint that is entirely wrong, though unfortunately common. The expectant mother is not ill, and should not be so regarded. Her life is to be arranged not by the rules of the sick-room, but according to the laws of hygiene laid down for healthy people.

At no time is the faithful observance of those laws more important than during pregnancy. Though the mother is not sick it is nevertheless true that her body, undergoing such pronounced changes, is in a state of somewhat delicate balance and can easily be disordered by abuse. Furthermore, her baby is entirely dependent on her and his health is likely to be a faithful reflection of hers. For two good reasons, then, the pregnant woman should make a business

of keeping herself in perfect training no less conscientiously than does the athlete.

### DIET

There is a German proverb to the effect that a person *is* what he *eats*. This is almost literally true. Excepting the oxygen taken in from the air, every particle of our material selves is derived from our food and drink. Since food supplies the body with all its energy for work as well as with the substance for growth and repair, it is not surprising that faulty diet is capable of doing serious harm, while proper food is an important item in the maintenance of good health. This is particularly true in pregnancy, when an extra supply of energy is required by the mother and a new body is in process of building.

As far as special dieting is used in the treatment of disorders of pregnancy like flatulence and constipation, it will be considered in the next chapter. We are interested now in the everyday eating and drinking of the normal prospective mother.

**The Composition of Foods.** Most foods are combinations of six general sorts of material: proteins, fats, carbohydrates, mineral salts, water, and vitamines. The proportions of these six constituents vary greatly in different foods. For example, the percentages in a ripe banana are protein 1.3, fat 0.6, carbohydrate 22, mineral matter 0.8, and water 75.3; in wheat flour they are protein 7.9, fat 1.4, carbohydrate 76.4, mineral matter 0.5, and water 13.8. The volume of the vitamines is too small to be estimated in figures.

*Proteins* are constituents of all natural foods, but are most abundant in meat, fish, eggs, and cheese. The white of egg is almost pure protein, in combination with water. The protein of our diet has one special function to perform:

it supplies the material out of which tissues are built during the period of growth in childhood, and are repaired and restored as they tend to wear out all through life. No other food-stuff will serve this purpose, and so a certain amount or protein must be included in every diet. This may be obtained entirely from vegetables, but a mixture derived from animal and vegetable sources is generally better. Any excess of protein over and above what is necessary to build tissue can be used, like fat and carbohydrate, for fuel.

*Fats* come mainly from meat, butter, and cream, and to a lesser extent from certain vegetables. They serve for fuel, supplying heat and other energy as they are burned up. Though fat is a very good fuel most people naturally eat it in rather limited quantity, probably because it is absorbed with some difficulty. It may be omitted from the diet altogether. An excess of fat is stored up, chiefly in the tissues underneath the skin, where it remains until needed as a reserve supply of nourishment.

*Carbohydrates* include sugars and starches. This food-stuff is obtained from all fruits, vegetables, and grains; there is little or none of it in meat and fish. It is easily digested and absorbed, and is an ideal fuel. If more carbohydrate is taken than the body can burn, it may be converted into fat and so stored for future use. While carbohydrate is an important part of every well-balanced mixed diet it, like fat, is not essential to life, for its function as fuel can be fulfilled by the other food-stuffs.

*Mineral salts* must be included in the diet because they, together with the proteins, supply certain materials necessary for tissue-building. They occur in ordinary foods in quantities more than sufficient for our needs, so that we generally do not take them into account in arranging the diet except for the addition of sodium chloride, or ordinary

table-salt. Sometimes in pregnancy it is desirable to add also small amounts of a salt containing iodine, for the prevention of goitre. Iron is obtained from spinach, sauerkraut, lettuce, and meat; lime from eggs, milk, cheese, and green vegetables; and other minerals from such foods as the average person would naturally eat.

Water is another essential item in our diet, as everybody knows. The human body is by weight nearly two-thirds water, which is constantly being lost through the urine, the perspiration, and the breath. Though nearly all solid food contains a considerable proportion of water, it is necessary to take liquids as well in order that the total amount of fluid in the body may be kept up to normal.

*Vitamines* are substances of which we knew nothing at all until comparatively recently; of their real nature we still know very little. We have learned, however, that they occur in certain foods and that the body, if deprived of them, will suffer in one way or another. Five different vitamines are recognized at present. Vitamine A, so-called, is widely distributed in ordinary foods, and is found particularly in milk, butter, eggs, and green parts of leafy vegetables, and the organs, like liver, brain, and kidneys, that are used for meat. A deficiency of this vitamine interferes with growth and nutrition and leads to a peculiar sort of eye-disease. Vitamine B is obtained from fresh meat, whole grains, yeast, milk, fruit-juices, and many vegetables. A lack of it produces a disease of the nerves rarely seen in this part of the world, but occurring among natives in the East who remove from rice, the staple article of their diet, the outer husk in which this vitamine is contained. Vitamine C is present in the citrous fruits and fleshy vegetables, as well as in cabbage, lettuce, and spinach. The disease scurvy results from an insufficiency of vitamine C; this used to be a common ailment among sailors for whom fresh food was

not available during the long voyages of the old sailing ships. When it was learned that fresh fruit-juice would ward off scurvy, a supply was always provided; thus the vessels became known as "lime-juicers." Vitamine D occurs mainly in milk, and probably helps to prevent rickets. Vitamine E, of which lettuce is the best-known source, is believed to have a stimulating effect on fertility.

Any good mixed diet contains all the necessary vitamines in ample quantity. There is no advantage in eating yeast or other special articles with the idea of obtaining an extra supply of these substances.

The process of metabolism includes the taking in of food; its digestion and absorption; the building of tissue and production of energy from it; and finally the elimination of waste-products.

The activity of the metabolism varies according to the food taken and the work done by the body and also according to the condition of the ductless glands, which to a large extent control and regulate the whole process. To determine whether these glands, and in particular the thyroid gland, are functioning normally, doctors nowadays frequently test the activity of the metabolism. Since the test is usually made under resting, or *basal*, conditions, it is spoken of as a determination of basal metabolism.

One other term, now generally familiar, might be explained in this connection. The *calorie* is a measurement of heat. A gram of fat, when burned in the body, will yield 9.3 calories of heat-energy; a gram of protein or of carbohydrate yields 4.1 calories. Thus the amount of energy-producing food that we take can be reckoned either by the actual weight of the food or by the amount of energy, expressed in calories, which that food will generate. The average woman requires a diet which produces about 2800 calories a day.

**General Principles of Diet in Pregnancy.** The *animal foods*—meat, fish, eggs, and cheese—should be eaten in great moderation, for a low protein content is an important feature of the diet. The waste products of protein are eliminated through the kidneys; if an unnecessarily large amount were taken, these organs, which must be carefully protected during pregnancy, would have to carry an excessive burden. Not oftener than once a day ought food of this type to be included in the menu, and toward the end of pregnancy it is wise to restrict it still more. The protein necessary to repair the mother's body and build the baby's could easily be obtained from other foods, even if no meat or fish were eaten. Milk is a valuable source of this material, and some of it is derived from all fruits, vegetables, and cereals.

*Fresh fruit* is an exceedingly desirable article of diet, for in addition to supplying nourishment and water it helps to regulate the bowels. Raw fruit is in general better than cooked, and fruit eaten alone is more laxative than when taken with the meals. The patient may follow her tastes, eating any of the following fruits in season: apples, pears, peaches, apricots, figs, cherries, grapes, plums, dates, prunes, pineapples, berries of all sorts, oranges, and grapefruit.

*Vegetables* should have a prominent place in the dietary of pregnancy. Indeed, the expectant mother would do very well on a strictly vegetarian diet, though such limitation is ordinarily by no means necessary. The green or "leafy" vegetables are particularly beneficial, as are likewise most uncooked vegetables such as onions, celery, tomatoes, lettuce, and cress. Asparagus, string-beans, beets, carrots and spinach are valuable. Potatoes, peas, and lima beans may usually be eaten. Vegetable salads are excellent provided that the dressing is not so rich as to

be indigestible. It is well to avoid certain vegetables which are prone to cause indigestion; among these might be mentioned cabbage, cauliflower, radishes, corn, egg-plant, and cucumbers. Parsnips and ordinary beans are better omitted because of their tendency to form intestinal gas.

*Cereals* are nutritious, especially when taken with cream and sugar, and are easily digested. The various forms of wheat, corn, rye, oats, barley, rice, and bran can all be recommended. The best bread is that made from whole wheat, bran, or corn.

For *desserts* there are the fruits, already discussed, and a nice variety of milky foods such as ice-cream, custards, and milk-puddings made with rice, tapioca, or cornstarch.

*Fluids* are important enough in any diet, but become doubly so during pregnancy because they dilute the urine and favor the action of the kidneys. Not less than three quarts of liquid a day should be taken by the expectant mother. Of this, two quarts ought to be plain water. Probably few women *want* to drink eight glasses of water a day; certainly few do so on their own initiative. In pregnancy, however, water is to be regarded as medicine and taken at regular times, preferably before evening. The third quart of fluid may be in the form of soups, broths, milk, buttermilk, cocoa, and chocolate. There is no objection to the moderate use of tea and coffee. Alcoholic drinks, however, must not be used except on the advice of the physician.

Indigestible foods will, of course, be avoided. While every woman knows from experience what is likely to disagree with her, the following articles are probably better omitted in all cases: pork, veal, goose, duck, sausage, fried food, rich pastry, hot bread, and all dishes that are highly seasoned.

*In general*, we may say that any food which is plain,

wholesome, and nutritious is suitable for the prospective mother. Many women when not pregnant select by choice a diet so healthful and sensible that it needs no modification whatever after conception occurs. Reasonable preferences may be followed within a fairly wide range. It is not uncommon for a woman's tastes in food to alter considerably during pregnancy, so that she desires articles that she had never before been accustomed to eat or refuses those which were her favorite dishes. The wholly abnormal "cravings," however, of which one occasionally hears, do not occur in perfectly healthy women.

*Regular habits of eating* are essential. It is better to take five or six small meals a day than three large ones. The mid-morning and mid-afternoon meals may well consist mainly of liquid nourishment. The evening meal ought to be light. Overeating is to be carefully avoided at all times, and especially in the last three months of pregnancy. The food should be well chewed, and enough daily exercise must be taken to insure its assimilation.

**The Mother's Diet as It Affects the Baby.** There is a popular idea that the mother should take large quantities of food during pregnancy because she is "eating for two." This is a mistake. The baby in the womb is in many ways like a parasite; he has no difficulty in securing all the nourishment he needs from the organism to which he is attached. It is not uncommon for undernourished and emaciated women to give birth to large fat babies. If the mother eats only as much as she wants, it is normally a certainty that the child will get all that he requires. Overeating on the mother's part may produce a very large baby; this confers no advantage on him, while the excessive diet predisposes the mother to indigestion and other troubles.

Attempts have been made by restricting the mother's diet along certain lines to keep the size of the baby below

the average in the hope of making the birth easier, but the results have not proved satisfactory. Nor is it a feasible scheme to try, as many have done, to make the baby's bones soft by reducing the amount of mineral matter in the mother's diet; such treatment may lay the foundation of rickets in the child.

Efforts to control the sex of the unborn child by regulating the mother's diet are, of course, futile, as anyone who has read Chapter V will understand.

Speaking broadly, we may say that if the expectant mother's diet is in every way suitable for her, one need not be concerned about its suitability for the baby. There is no way in which special dieting can help him. An excess of food in the last three months of pregnancy, on the other hand, tends to make him too fat, and a deficiency in the mineral constituents may interfere with his bony development. These errors, however, will not occur in a diet which is properly selected with the welfare of the mother in view.

#### CARE OF THE TEETH

We have already noted that the teeth are prone to suffer during pregnancy. If neglected they often develop cavities or become loose, and in some cases the gums show soreness and inflammation. It is clearly important to give the mouth the care which will prevent these troubles.

After each meal and also before retiring the teeth need to be thoroughly brushed, and any particles of food that may have lodged between them should be removed with dental floss. This treatment is to be followed by the use of an alkaline mouth-wash such as milk of magnesia, or a teaspoonful of baking soda in a glass of water. The mouth-wash ought also to be used after every attack of vomiting, since the acid secretions of the stomach are probably a main factor in causing the mouth-troubles of pregnancy.

The expectant mother should by all means visit her dentist as soon as she knows that she is pregnant, informing him of her condition and putting herself into his hands. Even if her teeth are sound he will probably want to inspect her mouth at regular intervals as a measure of prevention. If any trouble is discovered it must be corrected before it has a chance to grow worse. Despite the popular idea to the contrary there is no reason why necessary dental work, temporary or permanent, cannot be done during pregnancy; this is true even of extractions. A little work done then often avoids much later.

#### EXERCISE AND FRESH AIR

The value of exercise is two-fold. In the first place, it develops the muscles by use. In the second, it stimulates the body to the better performance of all its functions. The circulation is quickened; the elimination of waste through sweat-glands and lungs is increased; and the appetite, digestion, and bowel-action are improved. In short, the result is a smoother working of all the bodily machinery, and this in turn produces steady nerves and a clear brain.

During pregnancy it is not wise to aim at increasing the muscular development; that should have been accomplished to the proper degree in the patient's earlier years. On the score of its stimulating value, however, exercise ranks high among the items of good prenatal hygiene.

Many pregnant women, wrongly regarding themselves as "delicate," tend to become fixtures in the house and to lead sedentary lives. The resulting sluggishness of body and depression of mind increase the discomforts of pregnancy and bring the patients to the ordeal of labor in a condition far from the most favorable. A life of moderate activity should be the aim of every normal expectant mother.

There are two necessary limitations to what the patient can safely do in the way of exercise; provided these are observed she may follow her own inclinations with regard to the character and total amount of physical effort to be included in her daily program. First, she must of course avoid activities that involve severe exertions, violent strains, or much jarring and jolting. On this count most of the ordinary sports and games are forbidden. Swimming, horse-back riding, tennis, golf, and dancing are all inadvisable though some women, more fortunate than prudent, indulge in them with impunity. Second, she must *never* allow herself to become exhausted or thoroughly fatigued, either by work or by play. The slightest feeling of weariness should be the signal for an immediate period of rest.

The ideal form of exercise for the pregnant woman is walking, and two hours of this each day is a reasonable prescription. With the aim of avoiding fatigue it is usually best to divide the daily performance into two one-hour walks, and sometimes into several short walks of fifteen or twenty minutes each, totaling three to six miles.

A woman unaccustomed to exercise may find herself unable at first to walk two hours a day without fatigue. She should then begin with several five-minute walks; by gradually increasing their length she will soon become able to accomplish all that is desirable. A patient who in early pregnancy is much troubled by nausea often does not feel equal to taking long walks. In her case, too, several short excursions will be of benefit. A similar plan may be followed in the last month also, when the patient's size makes it inconvenient for her to get about; the need for exercise is, at any rate, not so great at that time, and less may be taken.

Ordinary bad weather offers no reason for omitting the

daily walks, which should be looked upon as medicine a great deal more valuable than pills or potions. There is an old saying that shoe-leather is cheaper than physic. A healthy person properly clad is never harmed by wind or rain. On extremely inclement days the exercise may be taken on a sheltered porch, or in a room with all the windows wide open.

Light house-work is as a rule beneficial to the expectant mother. It affords exercise of a sort, engages her interest, and prevents the dissatisfied state of mind which is the inevitable consequence of an idle life. She must avoid all the heavier tasks such as large washings, much going up and down stairs, lifting weighty objects, and the running of a sewing machine by foot-power. Light sweeping is a gentle rhythmic exercise of value, particularly if done in a well ventilated room or outside. Simple work in the garden and such other duties as take the mother out-of-doors are highly desirable, and may be substituted in part for the daily walks. In no case can work in the house take the place of exercise in the open air. If out-door exercise proves fatiguing because the patient is already tired by domestic tasks, let her arrange to do less house-work, or none.

*Gymnastics* and *calisthenics* are not necessary during pregnancy. Work of this sort to which the patient has been accustomed had better be stopped, except by express permission of the doctor. *Massage* is a substitute for active exercise, helpful when the mother has some incapacity such as heart-trouble which prevents her from exerting herself, but superfluous in normal cases.

With regard to *travelling*, we may say that as a general thing it is better avoided during pregnancy. Each case, however, is to be judged on its own merits. There would be less objection to a journey in the middle of pregnancy

than to one in the first three months when the risk of miscarriage is greater, or in the last two months when the mother is less active and the possibility of premature delivery exists. The length and ease of the contemplated journey must be considered, as must also the mother's general condition. The best rule for the pregnant woman is not to consider travelling except for some important reason, in event of which she should consult with her doctor and abide by his advice.

The *automobile* is so much a part of modern life that the expectant mother always wishes to know what restrictions must be placed on motoring because of pregnancy. To short rides over good roads there is usually no objection; in fact, the passive exercise and the fresh air are beneficial. On the other hand, riding over rough roads or prolonged and fatiguing trips should not be undertaken. A pregnant woman ought never to drive a car herself.

The importance of *fresh air* is now appreciated by most people. Sunshine also contributes to health, for the direct sunlight contains certain so-called ultraviolet rays which have a definite germ-killing power. Hence the more time the mother spends out-of-doors, whether exercising or resting, the better.

In the house every effort must be made to secure constant good ventilation. Since one person uses up in one minute the oxygen of four bushels of air, it obviously does not take very long for the air in a closed room to become foul enough to cause headache and lassitude. The results of bad ventilation are, in effect, a sort of poisoning.

The windows of an occupied room should always be at least partly open. Direct draughts are avoided by lowering the upper sash, or by the use of a window-board or a regular ventilator under the lower sash. Now that the ancient prejudice against night air is dead, everyone knows

that the bedroom ought to be particularly well ventilated. There is nothing better than sleeping out-of-doors if suitable arrangements can be made.

#### SLEEP AND REST

The expectant mother must plan to get at least eight full hours of sleep each night. Many women require more. It is better to cut short the evening's diversions or to delay the morning's duties than to obtain insufficient rest. If certain symptoms like irritability of the bladder or shortness of breath interfere with an unbroken night's sleep, a longer rest in bed should be taken to make up for the loss.

Some pregnant patients sleep badly even though they are not suffering from any physical discomfort. In treating insomnia of this sort the first requirement is to cultivate calmness and freedom from worry, for a mind keyed up to the highest pitch during the day can scarcely be expected to compose itself serenely as soon as its possessor gets into bed. Overeating at the evening meal should be avoided. A short walk taken just before retiring is often helpful; so also is a warm bath, a glass of hot milk, or a hot-water bottle applied to the feet, as these measures all draw the blood away from the brain.

In addition to the night's rest the mother ought to lie down for an hour in the middle of the day, preferably just after lunch. She would do well to undress and go to bed in the regular way at this time. Whether she sleeps or not is unimportant, but she must relax completely in body and mind, and to do that in these strenuous days is an art which most women have to acquire. It is the duty of other members of the household to see that she is not disturbed.

A patient who keeps reasonably active through most of the day should form the habit of sitting quietly in a comfortable chair for fifteen minutes twice in the morning and

twice again in the afternoon. Toward the end of pregnancy even more rest will be advisable.

Many women tire easily during pregnancy. They realize, often to their great annoyance, that though they feel perfectly well they have much less energy than before. This is Nature's way of calling attention to the need for that rest which is the natural protection from the dangers of exhaustion and fatigue.

### CLOTHING

The clothing of the pregnant woman must above all things be healthful and comfortable. If at the same time it is pleasing in appearance, as is usually the case with modern maternity apparel, it has the added advantage of allowing the mother to go among her friends and to take recreation in public without self-consciousness or embarrassment.

From the standpoint of health and comfort, the essential features of maternity garments are two: sufficient warmth and freedom from constriction.

The main purpose of clothing is to keep the body warm, thus promoting an even circulation of blood and normal function on the part of the sweat-glands. The mother's clothing must, therefore, adequately protect her entire body, but should be as light in weight as is consistent with this function.

Maternity apparel should also be loose since any constriction, especially around the abdomen or breasts, would obviously do harm. In general it is better for garments to hang from the shoulders than to be supported at the waist.

The underclothing is, of all the garments, the most important with reference to keeping the body warm.

Except in hot weather or in a well heated house the only

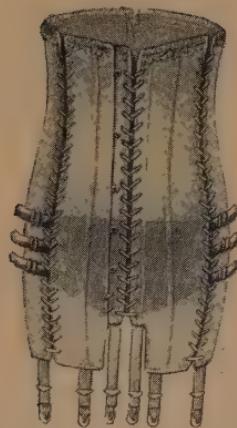


FIG. 8. A SATISFACTORY MATERNITY CORSET, FRONT VIEW



FIG. 9. A SATISFACTORY MATERNITY CORSET, SIDE VIEW



satisfactory undergarments are those with high necks, long sleeves, and ankle-length legs. The unionsuit is preferable to separate shirt and drawers. Wool is the best material because it absorbs moisture readily and prevents the escape of body-heat. For the same reason cotton is better than linen or silk.

In the summer, underclothing of a lighter type, as regards both style and material, is permissible. A good garment is the so-called "combination" with short sleeves and knee-length legs, made of light wool or porous cotton.

The corset is an apparatus of which the value, both in pregnancy and at other times, has been the subject of much difference of opinion.

With regard to the non-pregnant woman, the writer's view is that she is much better off without corsets provided her abdominal muscles are strong and give good support. Indeed, one of the evil effects of tight corsets is to damage and weaken those muscles. If, however, the abdominal wall is markedly relaxed, then corsets may be very useful to provide that support which the natural mechanism is no longer able to give.

In pregnancy the circumstances are somewhat different. At first no extra support is needed, and if the patient has not previously worn corsets she may continue to go without them until the end of the fifth month, or even later. If, on the other hand, she has been accustomed to a loose and sensible type of corset, its use may be continued until the end of the third month. It must then be replaced by a special maternity supporter, since subsequent to the third month the ordinary corset can only do harm.

In the latter half of pregnancy all patients should be provided with some special form of abdominal support. Otherwise the abdominal muscles would be unduly stretched by the large and heavy womb, and the posture would be so

altered that backache might become very annoying. The need for such an appliance is generally greater in subsequent pregnancies than in the first, because the muscles are more likely to have become somewhat relaxed.

There is a great variety of maternity corsets, corset-waists, belts, and other supporters. Some are bad and some are good; no one style is suitable for all cases. The wisest plan for each patient is to have her doctor recommend the appliance best adapted to her, and then to let him adjust it before it is worn. The writer's experience has been that those who sell these articles rarely know how to adjust them properly.

A good maternity supporter lifts the womb without constricting any part of the abdomen or chest; at the same time it steadies the pelvis, for it fits snugly around the hips. To accomplish best these effects one should lace it from below upward and leave it decidedly loose at the top. The ideal corset is of soft material and contains few if any bones; its construction allows frequent adjustment to the increasing size of the abdomen.

In the last few weeks of pregnancy a linen or rubber abdominal binder is sometimes more satisfactory than any corset. This is often worn at night as well as in the day-time, for its steadyng effect on the heavy womb adds much to the mother's comfort whether she is on her feet or lying down.

A brassière is not necessary if the corset comes high enough to support the breasts. Unless such is the case some sort of light brassière ought usually to be worn, particularly when the breasts are heavy or painful. This garment should lift rather than compress the breasts, and should under no circumstances make pressure on the nipples. If the breasts secrete any considerable amount of fluid, small squares of sterile gauze may be placed over the nipples inside the brassière to protect the clothing.

**Garters** of the circular elastic type must never be used, for they hinder the circulation in the veins of the legs. The stockings may be rolled, or may be held up by side-supports attached to the corset or hanging from the shoulders.

**Shoes** are always to be selected with some care. Since the posture and the whole balance of the body change with advancing pregnancy, proper footwear is essential to insure steady poise and freedom from back-strain. The very high French type of heel is never allowable. On the other hand, low flat heels are not necessarily indicated, for if a woman is unaccustomed to them they may strain the arches of the feet. Either low or medium high heels will prove satisfactory provided the equilibrium of the body is well maintained and the feet are not uncomfortable. It is wise to wear shoes a full size larger than usual, because during pregnancy the feet often become somewhat swollen.

**The outer garments** should be fairly light; to keep the body warm it is better to depend mainly on the under-clothing and on the usual out-of-door wraps. Certainly heavy skirts ought not to be worn. The ordinary maternity dress is an admirable garment; being made in one piece it hangs from the shoulders, and hence does not constrict the waist. There is a variety of such apparel, adaptable to the changing figure and at the same time neither unattractive nor conspicuous.

#### CARE OF THE SKIN

The skin is often thought of simply as the protective covering of the body. In point of fact it has three other important functions. It contains the nerve-endings which pick up sensations of touch, pain, heat, and cold; it aids, by a very complex mechanism, in maintaining an even body-temperature; and it acts as an organ of excretion.

In the deeper parts of the skin are located the sweat-glands. Each gland is a tiny coiled tube, described by Oliver Wendell Holmes as resembling the intestines of a fairy. From the gland a minute straight tube runs to the surface of the skin, where its opening constitutes what is ordinarily called a pore. Although a single sweat-gland is of microscopic size, so enormous is the number of these structures that their combined length in one human body has been computed to be twenty-eight miles.

The sweat-glands are constantly in action. Even on a cold day they probably give off no less than a pint of "insensible perspiration." In warm weather this amount is, of course, greatly increased. Pregnancy commonly has a stimulating effect on the perspiratory function.

While the sweat is largely water, it also contains certain waste materials. The free elimination of these by way of the skin lightens the burden on the other organs of excretion, particularly on the kidneys. No person could live unless some, at least, of his waste were excreted through the skin.

The two items which mainly promote normal activity on the part of the sweat-glands are proper clothing and bathing. There is in bathing the double advantage of stimulating the circulation of the skin and of removing surface accumulations which might tend to clog the pores.

The daily bath is an essential feature of the hygiene of pregnancy. Tub-baths are allowable up until the last six weeks, when it is better to substitute the sponge-bath. The water should be tepid or only pleasantly warm, since extremes of heat or cold might have effects upon the circulation not desirable in a bath intended primarily to be cleansing. As a rule the best time for bathing is in the evening. The bath should not come directly after a meal, nor should it be followed within an hour by any active exercise.

A woman accustomed to taking a cold shower in the morning may continue this practice during pregnancy with benefit, as it is an excellent stimulus to the circulation. It would not be advisable, however, to start the taking of cold showers during pregnancy except with the doctor's sanction. In any event this sort of bath is no substitute as a cleansing agent for the daily warm tub or sponge-bath.

Sea-bathing is not without risk for the expectant mother, chiefly on account of the muscular exertion involved and the violence of the surf. On the other hand, when the weather is sufficiently warm there is usually no objection to bathing in a quiet river or lake.

The pigmentation of the skin described in Chapter IV requires no treatment; most of such coloring will disappear of itself after delivery. As regards the streaks which often develop in the stretched abdominal skin, there is little that can be done in the way of prevention. Some women consider it helpful to rub the abdomen daily with mutton-fat, olive oil, or other lubricating substance; at any rate there is no harm in these measures.

#### MENTAL HYGIENE

That the mind and body are closely interrelated no one doubts, and we are all familiar with illustrations of the influence which each may have upon the other. To realize the effect of bodily states on the mind we need only recall how one's whole outlook on life is sometimes altered by a change of clothing and a good meal. The control which the mind subconsciously exerts over the functions of the body is perhaps less obvious but nevertheless of great importance, for it is capable of doing both good and harm.

Doctors recognize a type of patient who is a real sufferer from genuine symptoms, although the closest investigation shows the body to be in perfect physical health. The

trouble in such a case originates in the mind, however improbable this may seem to the patient, and a cure often results from mental treatment of the sort which we call *suggestive therapeutics*. On this basis are explained most of the cures wrought by quacks and by the various sects and cults of self-styled healers that today infest the country.

With any person worry has a deleterious effect upon the workings of the body. Sleep and digestion are usually the first functions to suffer, but other disturbances readily follow. The idea of a "brow furrowed by care" is not entirely a poetic concept.

The expectant mother, especially in her first pregnancy, is often prone to worry. We cannot wonder at this. The new and strange experiences, many of them involving some discomfort, tend to keep her thoughts focussed on her physical condition and to disturb and perplex her. There are always, too, thoughtless friends who make it their business to remind her of the comparatively rare cases where all has not gone well.

It is not always the easiest achievement in the world to avoid worry and emotional strain and to develop a calm and cheerful frame of mind, but *it can be done*. Two things in particular may be counted upon to help.

In the first place let the mother, having selected a doctor whom she trusts, transfer to him the entire responsibility for her physical welfare. When she realizes that he is able to relieve her discomforts and to explain what she does not understand, most of her worries about herself will automatically take wings and fly away. Let her remember that childbearing is a *normal* process, and that the occasional abnormalities which occur rarely become serious unless they are unrecognized in their early stages or are neglected. There is small chance of any such neglect if a woman is following the instructions given in this book.

In the second place, the mother must divert her mind by healthy occupation and amusement. Idleness breeds discontent. In addition to doing her daily work, she should systematically plan to enjoy good books, public entertainments, out-of-door recreations, and the society of cheerful friends. As far as is consistent with giving herself the proper care she ought to forget that she is pregnant and lead the same sort of life which would at other times keep her contented and happy.

#### THE MARITAL RELATION

There is a difference of opinion among doctors upon the advisability of sexual intercourse during pregnancy. Some see no objection to it, while others believe that it should be entirely prohibited. The usual custom, at least among modern civilized people, is to use care and moderation but not to abstain altogether.

The wishes of the wife should first be taken into account. To some pregnant women the sexual act is repugnant, while others desire it more than at ordinary times. There is no need to emphasize that in this, as in other matters, the expectant mother should receive every consideration.

In the case of healthy persons with normal desires, the writer is of the opinion that intercourse during pregnancy does no harm so long as certain precautions are observed. The act must be practised with gentleness and in moderation, particularly during the first three months since that is the period at which miscarriages are most likely to occur. If there is known to be a tendency toward miscarriage, then absolute continence must be the rule. Under no conditions should there be any intercourse during the last six weeks of pregnancy, for the risk of premature delivery and childbed fever would be incurred thereby.

## CHAPTER VII

### CERTAIN TROUBLES AND DISCOMFORTS, AND HOW TO AVOID THEM

The expectant mother will most surely gain relief from the minor discomforts of pregnancy, and freedom from the major troubles, by taking full advantage of the careful supervision which the doctor desires to give her. No matter how well she feels every pregnant woman ought to visit her doctor once each month during the first seven months and at two-week intervals during the eighth month and the ninth. She should also be very ready to make additional calls upon him in event of any development which is disturbing or puzzling to her. The advice of friends who mean well but are necessarily ignorant about medical matters is not a safe guide at this important time, when watchfulness and prevention are the keynotes of treatment.

**Kidney Trouble.** Pregnancy causes a considerable increase in the work which the kidneys have to do; if the burden upon these organs should become too heavy a serious complication might develop. It is advisable, therefore, to help the kidneys in every possible way; the diet of pregnancy, with its low protein and abundant fluid, is arranged with that end in view. Fortunately the doctor has two simple but valuable methods of determining how the kidneys are working, and of detecting the very beginning of trouble: one of these is the taking of the blood-pressure, and the other is the examination of the urine.

In the matter of urine-examinations the patient can give her doctor a good deal of coöperation. To begin with,

he desires to know the total amount of urine which the kidneys are excreting. This is usually ascertained by measuring all the urine passed during a day and a night, so that the resulting figure represents the twenty-four hour quantity. Such a measurement ought to be made by the patient regularly once a week, the amount being written down for the information of the doctor.

The manner of collecting a twenty-four hour quantity of urine is as follows. The first urine passed upon arising in the morning is thrown away. All urine subsequently passed during that day and the ensuing night, together with that passed upon arising the following morning, is saved and collected in a vessel. At the end of the twenty-four hours the total quantity is measured. Under normal conditions it should not be less than three pints.

On the occasion of each visit to the doctor the mother brings with her the written record of the weekly twenty-four hour quantities, and also a sample for analysis. This specimen ought to be about six ounces of a freshly collected twenty-four hour mixture, in a clean bottle well corked and labelled with the patient's name and the date.

Persistent headache, puffiness of the eyelids, blurred vision, pain in the pit of the stomach, swelling of the ankles, and scanty urine are all symptoms suggesting that there may be trouble with the kidneys, though each of them can and often does arise from other causes. The occurrence of such symptoms should, however, lead the patient to consult her doctor at once and to take with her a specimen for examination, since if any real trouble is present prompt diagnosis is essential to successful treatment.

**Nausea and Vomiting.** The commonest complaint of this sort is the familiar "morning sickness," which makes itself felt as soon as the mother gets out of bed. It occurs mainly in the second and third months.

Arising from the recumbent position with the stomach empty seems to be a factor precipitating these attacks. Accordingly the simplest remedy is to take something into the stomach while still lying in bed. A piece of dry toast or a couple of unsweetened crackers may be eaten; occasionally patients get better results from a cup of hot coffee or tea. After eating or drinking the mother should lie quietly for half an hour and should then dress slowly and deliberately, sitting down as much as possible during the process.

Nausea and vomiting may also be troublesome at other times during the day, especially at meal-times. In such cases the first treatment is to arrange the daily diet in six small meals rather than three large ones. All food must be eaten slowly and chewed well. It often helps to lie down for a few minutes immediately after eating. Some women are relieved by an ice-bag placed over the stomach, and others by a hot-water bottle.

The nervous mechanism which controls vomiting is delicately balanced. With many people mental impressions and other seemingly trivial causes are sufficient to excite it. There are even instances on record in which the husband of a pregnant woman suffered from morning sickness! But on the other hand, this delicate nervous mechanism can be regulated to a considerable degree by conscious effort. The mother must try her best not to think of nausea or vomiting, and not to expect or watch constantly for these symptoms. She should occupy her mind as much as possible with healthy occupations and diversions. Ordinarily this sort of mental treatment will greatly reduce the annoyance of stomach disorders and will hasten the day when such trouble disappears altogether.

If vomiting is severe and persistent and does not respond to the simple measures just described, the doctor should

be consulted. He has methods of investigation which will reveal the cause of the trouble, so that he can then select the most efficient means of treatment. It is an interesting fact that many cases of severe nausea and vomiting in pregnancy are greatly benefited by taking as medicine a preparation of the corpus luteum of animals.

**Heartburn.** This symptom has nothing to do with the heart, but is the result of excessive acidity in the stomach. The acid secretions cause the sensation of burning.

The physiologists have discovered that fatty food taken on an empty stomach decreases the acidity of the gastric juice while, curiously enough, fat taken with a meal has exactly the opposite effect. On this knowledge is based the common treatment for heartburn in pregnancy. Half an hour *before* a meal the mother should swallow a tablespoonful of olive oil, or a cupful of rich cream. All fatty foods and fried dishes are then to be excluded from the meal.

As a means of neutralizing the excessive acidity a teaspoonful of baking soda in half a glass of water is useful and may be taken at any time. Other alkaline substances will serve the same purpose. Some patients carry with them a small piece of magnesium carbonate which they nibble whenever the sensation of heartburn appears.

**Flatulence.** The medical term for gas in the stomach and intestines is flatulence. It is a common complaint during pregnancy, and arises from sluggishness on the part of the bowels and from the action of the intestinal bacteria on food.

The first item of treatment is the cure of constipation, if that trouble is present. The patient should also avoid articles known to be gas-forming such as parsnips, beans, corn, fried foods, pastry, and an excess of sweets. The eating of one yeast-cake a day often assists intestinal digestion in these cases. Another helpful measure is wearing a proper maternity corset which supports the

womb and so to some extent relieves the bowels from pressure.

**Constipation.** If regular bowel-action is important at any time it is doubly so during pregnancy, for the failure of the intestines to throw off their waste-material places an added burden on the kidneys and to a certain degree poisons the whole system. Unfortunately constipation is a very common fault among pregnant women, and often one difficult to treat efficiently.

An effort should be made by the patient to establish a regular habit by going to the toilet at a fixed time each day, preferably just after breakfast, and spending a full twenty minutes there if necessary. No violent straining is permissible.

The diet ought to include an abundance of those fruits and vegetables which have laxative properties—in particular figs, prunes, oranges, apples, rhubarb, and tomatoes. Bran and graham bread assist by making the movements bulky and soft. The drinking of a large amount of water also tends to keep the intestinal contents soft and so is of direct value in preventing constipation.

Cathartic drugs and enemas must not be used during pregnancy except on the advice of the doctor. It is sometimes necessary to resort to these measures, and always better to do so than to allow the continuance of obstinate constipation, but a conscientious attempt should first be made to regulate the bowels by natural means.

**Haemorrhoids.** Piles, or haemorrhoids, are bunches of enlarged and swollen veins around the opening of the rectum. They are often present apart from pregnancy, but are of common occurrence in pregnant women because the womb presses on the great veins in the pelvis and partially obstructs the circulation. The most frequent symptoms are pain, itching, and bleeding.

Since haemorrhoids are undoubtedly aggravated by constipation, it is of first importance to avoid that fault. If the piles protrude from the anus they should be replaced inside; the patient can do this for herself by gentle manipulation with the vaselined forefinger. Often it helps greatly to lie down at frequent intervals with a pillow placed under the buttocks to elevate the pelvis, as thus the congested veins tend to drain by gravity. Cloths wrung out of cold water, or an ice-bag, applied externally will also aid in reducing the congestion. In case these measures fail, the doctor will probably prescribe suppositories or an ointment.

Piles developing in the course of pregnancy sometimes become worse immediately after delivery, but as a rule they subside a few weeks later and seldom require surgical treatment.

**Varicose Veins.** Very similar in character to haemorrhoids are the enlarged and dilated veins that occur in other regions—occasionally around the vulva, but most frequently in the legs. Such varicose veins are common enough in the non-pregnant, but may like haemorrhoids appear during pregnancy because of obstructed circulation from the pressure of the womb on the large vessels.

Another manifestation of poor circulation in the legs, often accompanying varicose veins but also occurring independently of them, is *swelling of the feet and ankles*. As seen in pregnant patients this is nearly always a pressure-symptom, and is therefore of no serious significance. We should not forget, however, that swelling of the ankles *may* be an indication of kidney trouble, the absence of which can be proved only by an examination of the urine.

An expectant mother suffering from these complaints must first of all avoid keeping on her feet very long at any one time. She ought to lie down frequently, and it is a good plan when she first lies down for her to hold her legs

straight up in the air, against the wall or the head of the bed, for five minutes. This measure alone will do a great deal to aid normal circulation.

In all but the mildest cases varicose veins in the legs need to have some sort of support while the patient is on her feet. An elastic stocking, obtainable at the drug-store, serves this purpose. Less expensive and often more comfortable is the flannel bandage—strips of flannel four inches wide cut on the bias and sewed together to make a bandage about eight yards long. In putting this bandage on, a few turns are first taken around the instep; the bandage is then carried up around the ankle, leaving the heel out, and up the leg as high as the enlarged veins extend. Since it is difficult to bandage a knee smoothly and securely the first bandage may end below the knee, another being applied above. The result should be firm even pressure and support over the entire varicose area.

When the feet and ankles are swollen it is important to wear shoes large enough so that there is no pinching or discomfort.

**Cramps in the Legs.** Not only is the growing uterus likely to make pressure on the veins, but it may also press on the nerve-trunks that run through the pelvis. From this cause come the cramp-like pains in the legs which are so common in the last few weeks of pregnancy. Sometimes there are feelings of numbness or tingling in the legs, rather than actual pains. At other times the pressure on the nerves gives rise to pain referred to the back.

These discomforts are best alleviated by frequently lying down, so that the weight of the womb is shifted. A maternity corset that properly supports the womb is helpful. Some patients gain relief from leg-cramps by gentle massage of the limbs. At all events this symptom, like most of the others discussed in the present chapter, may be counted upon to disappear of itself after delivery.

**Shortness of Breath.** When the womb becomes very large and takes up most of the room in the abdomen, it crowds against the diaphragm and interferes more or less with the movements of the chest. The result is *dyspnoea*, or shortness of breath, which is aggravated when the patient is lying flat. On this account some women find that they sleep much better during the last few weeks if they are propped up with several pillows or a bed-rest. A patient troubled with dyspnoea should not attempt to take a great deal of exercise.

**Palpitation.** Rapidity of the heart-beat occurring in pregnancy is usually not an indication of anything wrong with the heart. It is sometimes of nervous origin, but is more often the result of pressure against the diaphragm either from the enlarged womb or from gas-filled intestines. Such trouble may be annoying, but it is not serious. By way of treatment the patient should avoid flatulence, diminish her active exercise, and sit rather than lie down whenever the symptom appears.

**Leucorrhœa.** There is usually some slight whitish vaginal discharge during pregnancy, especially in the last few weeks, resulting from the natural congestion of the parts. This fluid has valuable lubricating and antiseptic qualities, and is perfectly normal.

If the vaginal discharge is excessive in amount, or if it causes itching or burning of the skin of the vulva, or if its color is other than pale white, it must then be regarded as an abnormal leucorrhœa for which treatment may be required. In all such cases the doctor's advice ought to be obtained. Under no circumstances should the pregnant woman take douches unless they are prescribed for her by her physician.

**Itching.** *Pruritus*, or itching, is occasionally very annoying to the expectant mother. It may be limited to the vulva and adjacent parts, or be felt all over the body.

In cases of itching of the vulva, we look first for a local source of irritation such as leucorrhœa, an overly concentrated or otherwise abnormal urine, or an affection of the skin itself. For each of these conditions the doctor can prescribe appropriate treatment. Since soap and water are likely to be ill tolerated by a delicate or inflamed skin, a measure of relief is often obtained by cleansing the vulva with pure olive oil.

When the itching is generalized it is usually of nervous origin. At times it is due to some irritating substance being excreted in the perspiration. If the mother drinks more water and takes a mild cathartic she will encourage the elimination of the offending material by way of the kidneys and the bowels. A teaspoonful of baking soda to the pint of water makes a good lotion for the affected regions. The patient may get relief from the soda-bath, remaining for fifteen minutes in a tubful of warm water to which half a pound of baking soda has been added; the skin should then be patted dry, and not rubbed.

**Breast Troubles.** In the preceding chapter it was stated that heavy or tender breasts ought to be supported by a properly fitted brassière or binder. With a view to avoiding difficulties in nursing later on, the breasts require attention during pregnancy in two additional respects: the nipples, if not already sufficiently prominent, need to be drawn out, and the skin of the nipples must be rendered tough.

In the majority of cases the nipples are found to be prominent enough so that the baby will be able to seize them without difficulty. Whenever they tend to be flat or retracted treatment designed to correct that deformity should be started during the fifth month and continued until the end of pregnancy. An old-fashioned method is to apply over the areola the open mouth of a heated glass bottle; as the air in the bottle cools it contracts, and the

partial vacuum thus created draws the nipple out. A similar effect is obtained by covering the nipple with the bowl of a clay pipe, and making suction through the stem. Perhaps the most efficient treatment is simple manipulation. The nipple is grasped between the thumb and forefinger, pulled out, held for a moment, and released. Each nipple is so treated for about five minutes, two or three times a day.

In order to avoid the development of soreness or cracks to the delicate skin of the nipples when the baby begins to nurse, all patients should during the last eight weeks of pregnancy adopt measures to toughen the skin, and employ them three times daily. The preliminary step is to wash each nipple for five minutes with castile soap and warm water; gentle friction is made by means of a fairly soft brush. Following this, either of two treatments may be used, both of which give good results. One is to anoint the nipples with vaseline or lanolin; they are then covered with small squares of gauze for the protection of the clothing. The other method is to wash them in a hardening solution, made by dissolving a teaspoonful of boric acid crystals in a mixture of three ounces of water and three ounces of grain alcohol.

#### **SUMMARY OF IMPORTANT RULES FOR THE EXPECTANT MOTHER**

1. Visit your doctor once a month during the first seven months, every two weeks during the eighth and ninth months, and in addition at any time when you are in the least uncertain or troubled about yourself.
2. Once a week measure and record the twenty-four hour amount of urine passed, and on the occasion of each visit to the doctor take him the record and a specimen.
3. Put yourself under your dentist's care at the beginning of pregnancy, and see him as often as he may direct.

4. Eat a simple and wholesome diet: it should include little protein; an abundance of fruits, vegetables, cereals, and milky foods; and at least eight glasses of water a day.

5. Be sure to obtain a daily evacuation of the bowels—by regular habits and proper diet if possible, but if necessary by laxatives or enemas under the doctor's direction.

6. Aim to get every day two hours of mild exercise, like walking, in the open air.

7. Sleep eight hours at night, lie down for at least an hour during the day, and never allow yourself to become thoroughly fatigued either by work or by play.

8. Wear clothing that is simple and warm, and loose enough so that there is no constriction around any part of the body. During the fourth month get a special maternity corset.

9. Support your breasts whenever they are heavy and painful; during the last five months draw out the nipples if they are not prominent; and in the last eight weeks use appropriate treatment to toughen the skin of the nipples.

10. Do not let yourself worry. Your body is performing a normal function, and if you are following the instructions here given you have nothing to fear. Keep busy with work and diversion, and you will keep happy.

11. Promptly report to your doctor any of the following symptoms:

Excessive vomiting

Persistent headache

Blurring of vision

Scanty urine

Swelling of feet, ankles, hands, or eyelids

Sharp pains in the stomach

Any vaginal bleeding

Obstinate constipation

Failure to feel life after it has once been felt

Anything else which worries you or seems unusual

## CHAPTER VIII

### PREPARATIONS FOR THE BABY'S COMING

**Home or Hospital?** The first arrangement necessary in anticipation of the coming of a baby is to decide where confinement shall take place, since the answer to this question will influence many other details of preparation.

Fifty years ago it was quite exceptional for ordinary normal confinements to be conducted in the hospital; even the abnormal ones were usually handled at home. In recent years, however, there has been a growing tendency on the part of patients and physicians alike to prefer the hospital management of obstetrical cases.

The hospital offers certain real advantages. For one thing, in surroundings where the care of such cases is a matter of everyday routine the most scrupulous surgical cleanliness is assured to a degree rarely equalled in any private house. Then too, in a hospital adequate equipment and personnel are always immediately available to deal with any complication which might arise.

It is, moreover, in many ways easier for the patient to go to the hospital. She avoids the need of numerous rather complicated preparations as well as some disturbance of the household routine, and she secures for herself ideal rest and relaxation during the early lying-in period.

On the ground of expense there is probably little to choose between the two plans. Good hospital-care can usually be obtained at a total cost no greater than would be entailed by the salary of a nurse and the purchase of supplies for confinement at home.

Nevertheless there is no reason why the majority of maternity cases cannot be conducted at home both safely and well. If the doctor agrees that the choice is open, the wishes of the mother and her family may then be allowed to decide the question.

#### PREPARATIONS FOR CONFINEMENT AT HOME

**Engaging the Nurse.** To the proper management of an obstetrical case at home the services of a nurse are hardly less essential than those of a physician. The care of mother and baby is enough to occupy the full attention of one person, and that person should of course be experienced and skilful in such work.

The regularly trained nurse best fulfills these requirements. So-called practical nurses are sometimes intelligent and reliable, but not always so. In any case the nurse selected must meet with the approval of the physician, for he cannot work under the most advantageous conditions unless he is able to depend upon the fullest coöperation from her.

It is generally wise to engage the nurse early in pregnancy. By so doing the mother makes certain of having the attendant of her choice. She furthermore gains the advantage of the nurse's suggestions and assistance in carrying out the preparations for confinement.

Since every nurse, in order to avoid intervals of idleness, reasonably expects to arrange her advance engagements according to a calendar, the mother must bespeak her services for a definite period. It is not always easy to decide beforehand just what this is to be, because, as we have seen, the date of the baby's arrival can be predicted only approximately. Most patients engage the nurse for a period of four to six weeks, beginning a week or even two before the expected date. Then if the baby comes in

advance of the calculated time, she is on the spot; if not, she can do much during the interval of waiting to make the mother comfortable and to assist with the various preparations. If the engagement of the regular nurse begins at the predicted date of confinement, one should bear in mind the possibility of having to get a substitute in event of the baby being born before that time. In such a case the substitute will expect to retire at the appointed date in favor of the regular nurse, who has reserved her time for the case possibly at the sacrifice of other engagements. How long the nurse is to be retained after delivery will depend upon circumstances, chief among which is usually the matter of expense. In general, the longer the mother can afford such very useful luxury, the better.

Having been engaged early in the pregnancy, the nurse should be asked to make two preliminary visits. At the first of these, some months before the baby is expected, she advises the mother about the necessary preparations. The other visit comes not long before confinement; at this time the nurse is able to inspect the arrangements already made and to improve or complete them. In particular she may now help the mother to sterilize dressings and other supplies.

**Preparing the Room.** Since as a rule the room in which the baby is born is also used by the mother during the lying-in period, it should be selected and arranged with both purposes in view.

The first requirements are good ventilation, sufficient warmth in winter, and reasonable coolness in summer. The room must be light, and the possible need for good artificial illumination should not be forgotten.

A quiet location is, of course, essential. Proximity to the bathroom adds greatly to convenience, as does also a separate room near by for the baby.

Carpets, heavy hangings, useless ornaments, and up-

holstered furniture are all out of place in an apartment where surgical cleanliness is of paramount importance. Bare walls and a wooden floor are most easily kept free from dust and dirt. About two weeks before confinement the room ought to receive a thorough cleaning.

The *bed* should be so placed that there is easy access to both sides. Few people except nurses realize how necessary a proper bed is for the best care of the patient. A brass or iron bedstead is always desirable. It must be narrow—that is to say, of single-bed width. It must also be high, for continual stooping is very fatiguing. A low bed can be raised to the desired height, usually thirty inches, by putting blocks under the legs. A firm mattress is needed; if it or the springs tend to sag, the necessary flatness may be secured by placing boards under the mattress over the springs.

*Other furniture* in the mother's room includes a dresser, two small tables, a washstand (unless the bathroom is close at hand), two or three straight chairs, and a comfortable rocker. The various supplies are stored until needed in the drawers of the dresser or in an adjoining closet.

#### SUPPLIES FOR DELIVERY AND FOR THE LYING-IN PERIOD

Before attempting these preparations the mother should confer with her doctor and nurse. The articles required will naturally depend to some extent upon the individual preferences of the attendants. Certain of them the doctor may wish to bring, while others he will expect to find ready in the house. It is, moreover, largely optional with the mother to what extent she will herself prepare the supplies, since in most localities ready-made confinement outfits are obtainable. As regards sterilization, this can be carried out at home or can be done at small cost in a near-by

hospital; alternatively, the necessary goods may be bought ready-sterilized. The first preliminary visit of the nurse will afford an occasion for discussing all these matters, so that the mother comes to understand clearly just what she is expected to provide.

The following articles are usually considered to be essential.

A good supply of clean sheets, pillow-cases, and towels.

Two sanitary belts or T-bandages. The T-bandage is a muslin belt, to the center of which is sewed a muslin strap long enough to pass down between the thighs and up to the point where the two free ends of the belt meet in front.

Two pieces of rubber sheeting, one  $2 \times 1\frac{1}{2}$  yards and the other  $1 \times 1\frac{1}{2}$  yards.

A two-quart fountain-syringe.

A hot-water bottle.

A bed-pan.

Three large basins, of agate or enamel-ware.

Two pitchers, of agate or enamel-ware, holding at least a quart each.

Two covered slop-jars or pails.

Three dozen safety-pins of different sizes, including six of the very large pins that are used for horse-blankets.

A two-ounce medicine-glass.

A medicine-dropper.

Two glass drinking-tubes.

A clinical thermometer.

A nail-brush with stiff bristles.

A cake of castile soap.

Four ounces of tincture of green soap.

A one-ounce tube of sterile vaseline.

Four ounces of powdered boric acid.

A bottle of tablets of bichloride of mercury. These are poison, and should be handled only by nurse or doctor.

One pint of grain alcohol.

A dram of 1 per cent solution of nitrate of silver.

*Sterile goods:*

Two sheets.

One dozen towels.

One pair of obstetrical leggings, made of flannel.

Six dozen sanitary pads. If prepared at home, these are made of absorbent cotton (or, less expensively, of cotton batting with a layer of absorbent cotton on one side) wrapped in gauze. They should be about ten inches long, four inches wide, and an inch thick.

Two delivery pads, about thirty inches square and four inches thick, made of the same materials as the smaller sanitary pads, and stitched or quilted at several points.

Six dozen gauze sponges. A sponge is made by taking an eighteen-inch square of gauze and repeatedly folding it so that the result is a thick pad about two inches square, with all ragged edges tucked inside.

Two dozen squares of gauze, four by four inches in size and one layer thick.

Four dozen cotton pledges—pieces of absorbent cotton as big as a hen's egg with all the loose threads drawn together and twisted into a spiral.

Four pieces of bobbin or narrow tape, each about ten inches long.

For the manufacture of the necessary dressings the patient will require about four pounds of absorbent cotton, six rolls of cotton batting, and forty yards of gauze or cheese-cloth, in addition to the bobbin and the flannel for the leggings.

The goods, when prepared, are done up in bundles prior to sterilization. For wrapping the bundles the best material is old muslin. The coverings are securely pinned or tied; they are then not removed until the supplies are to be used.

The two sheets are best wrapped separately for sterilization. The towels should be divided into two packages of six each. The two leggings are wrapped in one bundle. It is convenient to do up the sanitary pads half-a-dozen to a package. The two delivery pads may be sterilized to-

gether. Gauze sponges are wrapped in bundles of twelve, as are also the gauze squares. The cotton pledges may be put into two small bags, two dozen to a bag. The pieces of bobbin make one small package. On the outside of each bundle it is well to write in indelible pencil what is contained inside.

Dry goods are most satisfactorily sterilized by steam under pressure; this can be managed at home with no great difficulty, in the following manner. Into the bottom of a large wash-boiler are put about three inches of water, and between the handles of the boiler a wide strip of muslin is slung like a hammock. The packages of supplies to be sterilized are placed in the hammock, which should not touch the water, and the lid of the boiler is put on tightly. The dressings remain exposed to live steam for an hour. They are then taken out, dried in the oven (the packages must not be opened), and laid safely away until the time comes to use them.

#### PREPARATIONS FOR CONFINEMENT IN HOSPITAL

The arrangements with the hospital are usually made by the doctor, who first ascertains from the patient the type of accommodation that she desires.

In the ordinary normal case the mother does not go to the hospital until labor actually begins. The length of her stay there is determined by circumstances; the writer's patients are never advised to go home before the end of the second week, and many stay longer.

What the mother should take with her will depend upon the customs of the particular hospital to which she is going. It is advisable to seek information on this point in advance, either from the doctor or from the head obstetrical nurse of the hospital. Supplies for confinement are, of course, provided by the institution; many hospitals also have everything that is required by the baby during his stay.

In that case the mother needs to take for the baby only the clothes in which he will come home. For herself she will want her usual toilet articles, several night-gowns, a dressing-gown, slippers, and whatever *negligée* apparel she desires to wear in bed. It is a good plan to pack two bags, one for the baby and one for the mother, well ahead of time; thus everything will be in readiness when the moment of departure arrives.

#### THINGS TO BE PREPARED FOR THE BABY

**Wardrobe.** Complete layettes may be bought ready-made. Oftentimes, however, the mother and her friends prefer to make the garments themselves. Patterns for this purpose are obtainable in the shops.

In general, baby-clothing should be sufficiently warm but at the same time light and porous. The garments must be loose and roomy, and simplicity of style is an essential feature.

It is wise and economical to prepare in advance only such clothing as the baby will need during his first two months. His wardrobe can be increased later as other things are wanted. The following list includes all the articles necessary for the earliest weeks.

Four flannel belly-bands, six inches wide and thirty inches long, unhemmed.

Four knitted belly-bands, with shoulder-straps.

Four shirts, size 2. These have high necks and long sleeves, and open down the front. The best materials are cotton or silk in the hot summer, and a mixture of cotton and wool at other times.

Four dozen diapers, eighteen inches square, hemmed, of any soft absorbent material such as fine cotton bird's-eye.

Four pairs of knitted or woolen socks, for use if the weather is cold.

Four flannel petticoats, or "gertrudes." These garments hang

straight from the shoulders, open down the back or at the top, have no waist bands, and are about twenty-eight inches long.

Six dresses, or slips, with sleeves, also hanging straight from the shoulders, opening in back, and in length the same as the petticoats. Fine cotton and linen are commonly used for the dresses.

Four night-gowns, in style like the dresses, but of light flannel. Pucker-strings may be inserted in the hems at the bottom.

A flannel wrapper.

Mittens.

Cap or bonnet.

Shawl, blanket, or cloak.

**The Nursery and Its Furnishings.** The important features of the nursery are fully discussed in Chapter X, to which the reader is referred. At this point we need only insert a list of the necessary equipment. Articles marked with the asterisk (\*) will already be on hand if preparations have been made for delivery at home, since they are included in the list of supplies for confinement.

Suitable arrangements for ventilation.

Two sets of draw-shades for the windows, and also muslin curtains.

A bassinet, or metal crib, or both.

Adequate bedding.

A rubber sheet for the crib.\*

A low table.

Two low straight chairs without arms.

A chest of drawers.

A three-fold screen.

A clothes-rack.

A basket for dirty clothes.

Baby-scales.

An ordinary thermometer.

A bath thermometer.

A clinical thermometer.\*

A covered slop-jar or pail.\*

A baby's bath-tub.

- Two small hot-water bottles with flannel covers.
- Two large enamel-ware trays.
- Two agate or enamel-ware basins.\*

**Toilet Articles and Supplies for Nursing.** The following list is representative of what will be needed, though it may be considerably modified in any individual case.

- A rubber sheet thirty-six inches square,\* or a rubber apron.
- Two soft old blankets, for use in giving the bath.
- A dozen soft cotton towels or squares of old tablecloth.
- A dozen soft wash-cloths.
- A covered flat glass dish for oil.
- A covered glass soap-dish.
- Two covered glass jars.
- A hair receiver.
- A quarter-pound roll of sterile cotton.
- Four ounces of powdered boric acid.\*
- A cake of Castile soap.\*
- A cake of ordinary soap, to serve as a pin-cushion.
- Three dozen safety-pins of assorted sizes, including six very large ones.\*
- An eight-ounce bottle of mineral oil.
- A box of fine unscented talcum powder.
- A baby's hair-brush.
- A wide-mouthed nursing-bottle.
- Two rubber nipples for the bottle.
- A package of four-inch squares of sterile gauze.\*
- A roll of adhesive tape, one inch wide.
- A breast-binder or brassière; this may be improvised from an ordinary towel.

## CHAPTER IX

### THE ARRIVAL OF THE BABY

#### THE COURSE OF NORMAL LABOR

We have spoken of the womb as a *muscular* organ. Apart from the lining of its cavity, it is composed mainly of interlacing muscle-fibers. During pregnancy these fibers increase greatly both in number and in size, and ultimately become capable of exerting a very powerful force. All through pregnancy the muscle-fibers of the womb are undergoing slow rhythmic contractions so gentle that they are usually not perceived by the mother, though they can often be felt by the examining hand of the doctor. Such contractions do not accomplish anything in the way of opening the womb or expelling the baby, but simply afford a sort of mild exercise for the uterine muscle.

What may be the direct cause of the onset of labor we do not know, though there have been various theories upon this point. At all events, about forty weeks after the last menstruation the uterine contractions begin to assume a different character. They occur with gradually increasing frequency and also with greater force, so that they are felt by the mother as pains. They now acquire sufficient power to stretch open the mouth of the womb and to assist in pushing the baby out.

For convenience in description, we are accustomed to divide labor into three stages. The first stage lasts from the beginning until such time as the mouth of the womb is fully opened. The second stage then starts, and continues until the baby is born. The third stage is completed by the delivery of the afterbirth.

The duration of the whole process varies considerably, even in normal cases, and for that reason we usually find it difficult to predict with any degree of accuracy how long a particular labor will last. Generally speaking, the more frequent and vigorous the pains, the sooner will the child be born; the size of the baby and the rigidity of the mother's tissues are also, of course, considerable factors. It is not uncommon to encounter a first stage as short as two hours, or as long as thirty; the second stage usually occupies from a few minutes to three hours; while the third stage lasts anywhere from five minutes to an hour or even two. As a rule we may expect first labors to be somewhat more prolonged than subsequent ones, since the maternal parts are not so easily stretched. Average figures for first and for subsequent births are shown in the following table:

	FIRST STAGE	SECOND STAGE	THIRD STAGE	TOTAL
First labor.....	16 hours	1½ hours	½ hour	18 hours
Subsequent labors .....	11 hours	¾ hour	½ hour	12 hours

**The First Stage.** This is sometimes called the stage of *dilatation*, because its main feature is the dilating or opening of the neck and mouth of the womb. At the beginning of labor the external os is small—about large enough in most cases to admit an instrument the size of a lead-pencil. At the end of the first stage it is so widely open that the baby can pass through it and thus escape from the womb.

The dilatation of the cervix is accomplished by rhythmic contractions of the uterine muscle. At first these contractions are feeble and occasional only, but they soon become stronger, of longer duration, and more frequent. The earliest pains are short, and cause only slight discomfort; they may occur half an hour or more apart. Toward the

end of the first stage, however, vigorous pains will be coming every four or five minutes and lasting a full minute or longer. Occasionally the pains subside for a time (this seems often to happen when the doctor arrives), but they always resume and go on as though no interruption had occurred.

The pains of the first stage are most commonly described by patients as "dragging" or "grinding." They typically begin in the small of the back but later, as labor progresses, they are felt mainly in the abdomen and sometimes down the thighs. The old midwives used to speak of "back-labors" and "belly-labors," referring to cases where the pains were localized more in one or the other region. Each pain begins mildly, increases to an acme, and then gradually dies away. During the intervals the mother is, as a rule, perfectly comfortable.

The manner in which the uterine contractions dilate the cervix is very remarkable. As the uterus contracts it squeezes the bag of waters, and the lower end of this bag which fits into the cervix acts as a water-wedge, being driven down into the external os and forcing it a little wider open at each contraction. Furthermore, as the womb contracts it also shortens, and so tends to pull the lips of the cervix apart over that portion of the bag of waters which plugs the external os. Thus there is both a pushing and a pulling action in the mechanism of dilatation. Contrary to ancient belief the baby himself plays no active part in the process of being born—he is a passenger, and the motive power for his journey is supplied by the mother's muscles.

As the cervix dilates there is a variable amount of mucous discharge, usually more or less blood-tinged. This is known as *show*. It may appear early in labor or after the first stage has gone on for several hours and is always a good sign, for it indicates that real progress in dilatation is being made. Any considerable flow of pure blood, on the

other hand, is abnormal during the first stage and should be reported to the doctor immediately.

There are other signs, too, to demonstrate that the first stage of labor is progressing. At first the womb makes pressure on the bladder, causing a frequent desire to urinate. As the baby's head gets lower the pressure occurs more on the rectum and the impulse to move the bowels is felt. There may also be cramps in the legs, evidence of pressure on the great nerve-trunks that pass through the pelvis. When dilatation is well advanced the mother sometimes has a brief attack of shivering or of vomiting; these events are good omens, for they ordinarily mean the making of noteworthy progress.

Once the cervix is fully dilated, there is no further need for the bag of waters. Its function as a water-wedge has been fulfilled, and its continued presence would merely act as an obstacle to delivery. In most cases the end of the first stage is signalized by the rupture of the membranes—"the waters break," and a large part of the amniotic fluid comes in a sudden gush from the vagina, the remainder escaping little by little with the subsequent pains.

Occasionally the membranes rupture early in the first stage, or even before labor begins. What is called a *dry labor* or *dry birth* occurs in such cases, the first stage being somewhat prolonged because the advantage of hydrostatic dilatation is lost. In other cases the membranes fail to rupture spontaneously even after dilatation is complete, and have to be ruptured artificially by the doctor.

The opening through which the amniotic fluid escapes also allows the baby later to pass out of his membranous envelope. Rarely he is born with a portion of the membranes covering his head and face. Children thus "born with a *caul*" or "*veil*" are popularly supposed to be favored of fortune.

**The Second Stage.** This is the stage of expulsion, marked by the passage of the baby out of the womb, through the vagina, and into the world.

The pains now become stronger and soon occur every two or three minutes. They also alter in character. We speak of them as *bearing-down* pains, because in the second stage the mother feels the presence of something in her pelvis which requires to be forced out, and has an instinctive desire to strain or bear down as she would do in expelling a hard movement from the bowel. With each pain she brings into play the muscles of her abdominal wall to aid the musculature of the uterus. This is real *labor*, in the literal sense, but the efforts and the pain are more tolerable because the patient now feels that good progress is being made.

As the baby's head gets lower the symptoms of pressure on the pelvic nerves and on the rectum are exaggerated. Presently the head reaches the perinaeum; with each succeeding pain that structure becomes more stretched and thinned, and the outlet of the vagina more dilated. At last the baby's forehead, face, and chin slide over the perinaeum, and the head is born. Then follows a brief pause, after which one or two more pains are sufficient to force out the shoulders and the rest of the body. A little blood, together with what remains of the amniotic fluid, escapes as the body is born.

**The Third Stage.** In this final stage of labor the uterus expels the membranes, placenta, and umbilical cord, all of which collectively are known as the afterbirth.

As soon as the child has been born the womb tightens down into a hard ball about the size of a cocoanut. It still contains the placenta and membranes, and from it the umbilical cord leads out through the vagina and vulva to the baby. The doctor will shortly separate the child by cutting the cord.

The mother is now free from pain and feels generally much relieved. It is no uncommon thing at this time for her to have a slight chill, which is not considered abnormal.

After five to twenty minutes the womb again becomes active and begins to undergo regular contractions at intervals of four or five minutes. With each of these a little blood may appear. The third-stage pains are not, as a rule, severe. In the course of ten or fifteen minutes usually—sometimes sooner, and sometimes not for an hour or two—the contractions loosen the afterbirth from its attachment to the uterine lining. The womb now rises up to a higher level in the abdomen; a few more contractions expel the afterbirth from the vagina, together with a moderate amount of blood. The uterus then contracts into a hard lump, the top of which is at the level of the navel. There is no longer any active bleeding, though a slight flow will continue for several days. Thus labor ends, and the lying-in period begins.

#### THE MANAGEMENT OF NORMAL LABOR

**How to Tell when Labor Begins.** In the great majority of cases the first indication that labor has started is *regularly recurring* pains. These are most likely to commence in the small of the back, though they may be abdominal from the beginning. The early pains are very slight, amounting to nothing more than transient discomfort. They come at intervals which may be half an hour or even longer at the start but grow shorter and shorter as labor goes on. *Regular recurrence* is the most characteristic feature of labor-pains, and serves to distinguish them from pains of other sorts such as those caused by intestinal gas.

An occasional source of confusion exists in the form of so-called *false pains*—painful contractions of the uterus occurring in the latter part of pregnancy, often about the time of

lightening. These do not come, like labor-pains, with increasing severity and at lessening intervals, nor do they dilate the cervix and cause a show. Nevertheless they are often confused with true labor-pains, and have been responsible for many a "false alarm."

A show of blood-tinged mucus is good evidence that labor is in progress. It may not appear, however, until pains have continued for several hours.

Occasionally the first event in labor is the breaking of the waters; indeed, this may antedate labor by days or even weeks. Such a happening ought immediately to be communicated to the doctor. So also ought any flow whatever of pure blood.

**What to Do when Labor Begins.** The first thing, of course, is to notify the doctor in order that he may give any necessary instructions and may hold himself in readiness to attend. He will know when he ought to see the patient, and will make his arrangements accordingly.

*If the mother is going to a hospital*, there is then nothing else to do except to telephone the hospital, take the two bags that are already packed, and go.

*If the confinement is to take place at home*, the nurse should be promptly summoned unless she is already in the house. She and the mother together will then make certain preparations.

To begin with, they must see that the room is in order and that all the supplies are at hand. The packages of sterilized goods are placed conveniently near by, but are not opened until they are needed.

In the kitchen a large covered kettle of water is boiled for ten minutes, and then allowed to cool. Another large kettle or a wash-boiler should be half-filled with water, to be boiled later.

The bed is made up in the following manner. Over the

mattress is laid the larger of the two pieces of rubber sheeting which have been provided. Above this is spread an ordinary sheet, drawn tight and tucked under or pinned to the mattress all around. Then comes a so-called draw-sheet—a muslin sheet folded double, between the layers of which is inserted the smaller piece of rubber sheeting. The draw-sheet is placed across the middle of the bed, about where the mother's hips will come, and is tucked well underneath the mattress or pinned on each side. The coverings should be light—a single sheet or a sheet and a light blanket, according to the temperature of the room. Two pillows are desirable, one of them fairly hard and firm.

**The Management of the First Stage.** Early in labor the mother should take a soap-suds enema, thoroughly emptying the lower bowel. The pubic hair is then clipped very short or entirely shaved off, as the doctor may instruct. After this a complete sponge-bath or a shower-bath is taken. No douche should be used except by doctor's orders. The nurse will see that a sterile pad is applied to the vulva. The hair of the head is braided, preferably in two braids, and the patient dons a freshly laundered nightgown and stockings, together with slippers and a bedroom wrapper.

Throughout most of the first stage the mother is up and about, oftentimes engaged in light occupations. She should, of course, sit or lie down whenever she is tired, but a moderate degree of activity at this time favors the progress of labor. During a pain she will often find that it helps to bend forward somewhat, leaning against the back of a chair or the foot of the bed. On no account should she strain or bear down with the pains of the first stage, for that would be absolutely wasted effort.

The patient may take liquids freely during this stage of labor. An abundance of water is very beneficial; every three or four hours most women like to have a little broth, cocoa,

milk, weak tea, or coffee, often with toast or crackers. Near the end of the first stage there is sometimes a tendency to nausea, and from that time on it is better to take nothing, or water only.

The mother's surroundings should be quiet and restful. While there is naturally no reason why cheerfulness needs to be subdued, it is not wise to have any great number of talkative visitors present. Prolonged conversational efforts are likely to be more wearying than one realizes.

The constant presence of the doctor is seldom necessary during the first stage. In normal cases there is nothing for him to do at this time. The very word *obstetrics* means, according to its Latin origin, *standing by*; it well expresses the part to be played by the attendants throughout most of a normal labor.

At frequent intervals the doctor will see his patient, to ascertain that all is going well and to note the progress made. He will carry out certain examinations, the number and character of which is determined by the features of the individual case. Often it is sufficient to examine the abdomen only; in this way an experienced physician can frequently gain all the necessary information. In other cases it is important to examine from below also, either by the vagina or by the rectum. When vaginal examinations are made the doctor sterilizes the vulva and his hands with the most scrupulous care and usually puts on rubber gloves. Such precautions prevent the access of germs to the womb and so protect the mother from child-bed fever. From time to time the doctor also listens to the baby's heart and makes sure that the child's strength is not being overtaxed.

**The Management of the Second Stage.** It is now necessary for the mother to stay in bed. If she has to evacuate the bladder or rectum, a bed-pan must be used.

Under her buttocks the nurse puts one of the sterilized

delivery-pads. Her nightgown is turned up well above the hips, and stockings are replaced by the sterilized obstetrical leggings.

Her position in bed will depend upon the preference of the doctor. In this country most women are delivered on the back with the knees bent. In England the general custom is to have the patient lying on the left side, the thighs drawn up on the abdomen. Either position affords a good exposure of the vulva.

The word labor implies work, and in the second stage the mother must help the expulsion of the baby by the voluntary use of her own muscles. As a general rule she now bears down with each pain—that is to say, she draws in and holds her breath and makes forcibly the same sort of straining effort that would be necessary to expel a movement from the bowel. Most women require no instruction in this respect, for the natural desire to bear down becomes irresistible. Additional force is given to the mother's muscular efforts if her feet are firmly braced and she has something, like a towel or strap fastened to the foot of the bed, on which to pull. Between pains she should relax and rest.

Sometimes labor progresses so rapidly that there is risk of the baby being forced out before the gradual stretching of the mother's parts intended by Nature can be accomplished. In such a case all bearing-down efforts must be stopped, for they hasten delivery. The doctor may instruct the mother to open her mouth and take short quick breaths—to "pant," as in so doing she is unable to bring her abdominal muscles into play.

There are various little attentions by which the nurse can ease the mother's pains. To some women pressure against the back is particularly comforting. Cramps in the legs are often considerably relieved by rubbing and gentle massage.

The doctor will usually stay with the mother all through the second stage. He will closely watch the progress of labor and the condition of both patients. When it becomes evident that the time of delivery is approaching, he again sterilizes his hands and puts on rubber gloves; the vulva is sterilized and surrounded by sterile towels. Now, even in the most normal cases, there are small manipulations by which the doctor can make the birth of the head easier. As soon as the head is born he feels to determine whether the cord is around the neck, and if such should prove to be the case he gently slips it over the head. He then carefully wipes out the baby's mouth with a bit of sterile gauze. If the baby's color is pink, the doctor may wait for the spontaneous birth of the trunk and limbs; otherwise he extracts the shoulders, and the rest of the body at once follows.

**The Immediate Care of the Baby.** When the second stage of labor ends the baby is lying on the bed between the mother's thighs, and is still connected by the umbilical cord to the placenta within her womb. There are four things which must be done immediately for the child: to see that he breathes properly; to tie, cut, and dress the cord; to clean his eyes and treat them with an antiseptic; and to provide him with sufficient warmth. When these services are rendered the baby needs no further attention for some time, and the doctor may then devote himself to the conduct of the third stage of labor and to the care of the mother.

The *establishment of respiration* is the matter of first importance.

Previous to birth the baby did not breathe at all. His lungs were collapsed, and any attempt at respiration would only have filled them with amniotic fluid. His blood received the necessary oxygen and gave up the waste carbon dioxide in the placenta, by interchange of these gases with the blood of the mother.

Within a few minutes after birth the cord is tied and cut, and the placental circulation abruptly ceases. It is imperative, therefore, that the baby should begin to use his lungs at once, for otherwise he would rapidly die of asphyxia. In all human physiology there is no other example of a change so sudden as this, the whole function of oxygenation being shifted almost in the twinkling of an eye from the placenta to the lungs.

The great majority of babies breathe spontaneously as soon as they are born, usually crying lustily. The stimulus which starts respiration is probably the shift from the warmth of the womb to the relative coolness of the air. A vigorous cry is a welcome sound, for it shows not simply that the child is breathing, but also that he is forcibly inflating his hitherto unused and collapsed lungs.

Sometimes the new-born baby exhibits a condition of mild asphyxia, evidenced by blueness of his lips and skin. After a minute or two of normal crying the blueness disappears and is replaced by a healthy pink color.

Occasionally the baby does not start breathing spontaneously, and the attendant must then be prepared to give immediate assistance. The procedure in such cases is as follows. First, with a bit of gauze wrapped around the little finger the doctor very gently wipes out the child's mouth and throat, to remove any mucus which might be acting as an obstruction. Then the baby is firmly grasped by the ankles and held head-downward, and a few brisk slaps are administered to his buttocks. Generally this is all the encouragement needed to start natural respiration. In case these measures fail, the baby is next held by the shoulders and ankles and is dipped (except for his head) alternately into cold and hot water, both of which should always be ready. The cold water is taken directly from the tap, while the hot water should be at a temperature of

105 degrees. The child remains about ten seconds in the cold tub, and then thirty seconds in the hot. If three or four minutes of this treatment do not elicit efforts to breathe, artificial respiration is done by the direct mouth-to-mouth method. The baby's mouth is covered by a piece of porous gauze, to avoid direct contact; the attendant places his own lips over this and *gently* blows air into the lungs. Gentleness is essential, for the delicate lungs might easily be damaged by too vigorous blowing. After each inflation the attendant's mouth is removed and the air is allowed to escape from the baby's lungs. These efforts are continued at a rate not faster than fifteen times a minute until the child begins to breathe naturally, or the heart stops beating. Persistence for an hour or even longer is sometimes rewarded by success.

The *umbilical cord* contains the arteries and vein through which the baby's blood circulates in the placenta. Immediately after birth the pulse or beat of the child's heart can be felt in the cord, but in three or four minutes this pulsation ceases. We usually wait for the placental circulation to stop before cutting the cord, as thus a certain amount of extra blood is transferred from the placenta to the baby. In event of any emergency, however, the infant may be separated from his mother as soon as he is born. The cutting of the cord is the act which gives the child legal status as an independent individual.

There are two precautions to be observed in cutting the cord: everything used—doctor's hands, scissors, and tape—must be surgically clean, since infection in the navel might prove serious; and the cord must be securely tied before it is cut, to prevent bleeding from the stump.

With thoroughly washed and sterilized hands the attendant takes one of the pieces of linen bobbin that have been prepared, and ties it around the cord about an inch from

the skin-edge of the navel. The first knot is pulled as tight as possible, and two additional knots are made for greater safety. A second tape is next tied in a similar manner, three or four inches from the navel. Midway between the two ties the cord is cut with sterilized scissors. As the cut is made there is usually a single spurt of blood, but if the tapes are tied properly tight there should be no further bleeding from either of the divided ends. To protect the baby the attendant's left hand may be laid with its back to the baby's abdomen, the cord coming up between two of the fingers, while the right hand manipulates the scissors. A dressing is applied—two pieces of sterile gauze, one provided with a hole in its center through which the stump of the cord is drawn, and the other covering the stump. The bellyband which is to keep this dressing in place may be put on later.

The *baby's eyes* should *always* receive prompt attention. Even in a healthy vagina there are some germs, and in certain cases germs of a serious character are present. If these should get into the eyes of the child, as can easily happen in the process of birth, the sure result would be inflammation which might lead to blindness. A large proportion of those blind from birth are thus afflicted because the routine care of the eyes was neglected by the obstetrical attendant, for proper treatment is almost certain to avert that tragic accident. In fact, so important is this whole matter that several states have made it compulsory by law to use an antiseptic in the eyes of every new-born child.

A small pledget of sterile cotton is dipped in a saturated solution of boric acid, and with it the lids of one eye are gently washed clean. The lids are then separated, and from a fresh pledget several drops of the boric acid solution are allowed to run into the eye. The baby's head should

be turned to one side so that the solution will flow off over the temple, and not toward the other eye. Finally, two drops of a 1 per cent solution of silver nitrate (or of some other equally good antiseptic) are instilled into the eye with a dropper. The same procedure is then carried out for the other eye, using two new cotton pledges.

As regards *warmth*, we must remember that the baby has lived for nine months in the mother's womb, where the temperature has been nearly constant at 98.6 degrees. He now comes forth into surroundings in which the temperature is considerably lower. To a change so abrupt as this he must be allowed to adapt himself gradually, and so we should make sure that he is kept warm. Under ordinary conditions it is only necessary to wrap him in a warm blanket which covers his body and head, but not his face. In cold weather he may be put near a radiator or stove. For weak or premature babies some additional heat needs to be provided, and in the absence of an incubator this is usually afforded by small hot-water bottles. Great care must be taken lest the child be burned by bottles that are too hot; their temperature should never be greater than is comfortable to the attendant's forearm (not hand), and a flannel cover or a thickness of blanket must intervene between the bottle and the baby's skin.

**The Management of the Third Stage.** During this period of labor there is often little that the doctor needs to do for the mother except to practice "watchful expectancy" while waiting for the coming of the afterbirth.

He examines the perinaeum, and in case any stitches are necessary he usually puts them in at this time. He notes with particular care the amount of blood lost, and the condition of the uterus; these two things are directly related to each other, for when the uterus is well contracted there is no excessive bleeding. If the womb is soft and relaxed he

stimulates it to contract by seizing it through the abdominal wall above and massaging or kneading it. Certain drugs are also used to stimulate the action of the uterine muscle; one of them, pituitrin, may now be given by hypodermatic injection.

If the placenta is not born within a reasonable time after its detachment has been evidenced by the rising up of the womb, the doctor may force it out by skilful pressure from above. He always examines the whole afterbirth carefully to be sure that it has come away complete.

It is a common custom and a wise precaution against bleeding to give an injection of pituitrin, ergot, or some similar drug as soon as the birth of the placenta occurs and labor is finished.

**Management of a Birth without a Doctor.** When confinement takes place at the patient's home, in an occasional rare case it will happen, despite the best prearrangement, that the baby is born before the arrival of the doctor or nurse. Such an event should be regarded as self-evident proof that everything is easy and normal, rather than an occasion for anxiety. There are certain services which even an amateur nurse can render and also certain things which she should not do, and it may be worth while to set these down in the form of concise instructions, though they are all discussed and explained more fully either in the present chapter or elsewhere in this book.

1. Keep the mother in bed after the pains have begun to come as often as every five minutes or the waters have broken. She must not get up to go to the toilet.

2. Surround the vulva with sterilized towels, leaving it exposed to view. Never touch these towels unless your hands are scrupulously clean and have just been dipped into a 1 to 1,000 solution of bichloride of mercury. Do not touch the vulva at all.

3. When the head appears at the vulva do not let the mother bear down so hard that it is suddenly forced out. At least four or five pains should intervene between the first appearance of the scalp and the birth of the head.

4. After the head is born carefully wipe out the mouth with gauze, but do nothing else as long as the baby's face is pink. If the face is blue have the mother bear down strongly, and by gentle pulling on the head disengage the shoulders and deliver the body and limbs.

5. If the baby does not immediately cry, hold him up by the ankles and slap his buttocks. Rarely it may be necessary to use the other measures for resuscitation described in this chapter.

6. Both now and after the birth of the placenta keep constant watch of the amount of blood lost by the mother, and of the condition of her womb. If flowing is excessive or if the womb seems soft, perform massage in the manner described fully in the discussion of haemorrhage in Chapter XI.

7. Do not pull on the cord or make any other attempt to hasten the delivery of the afterbirth.

8. Provided the baby is breathing well, there need be no hurry about tying and cutting the cord, even after the placenta is born. Baby and placenta together may be laid in a warm place to await the arrival of the doctor. If you do decide to separate the baby from the afterbirth, follow the directions given in this chapter and be particularly careful about cleanliness.

9. In event of any development puzzling or disturbing to you send for another doctor, who will attend until your own physician arrives.

## SOME SPECIAL FEATURES IN THE MANAGEMENT OF LABOR

**Anaesthesia.** The first successful public demonstration of anaesthesia took place in Boston in 1846. Several months later Sir James Simpson began to use chloroform in obstetrics. This practice at first aroused great opposition; many people declared that any attempt to remove the "curse of Eve" was sinful. Before long, however, prejudice was overcome and anaesthesia was being used extensively in obstetrical work.

Nowadays practically all labors are made easier for the mother by the judicious giving of anaesthetics. These agents are not employed all through a labor; that would be injurious to both mother and child and is furthermore quite unnecessary, since in the first few hours the pains are not severe. But during the latter part of the second stage it is the custom to give a few whiffs of ether, gas, or chloroform with each pain. Such administration does not entirely abolish consciousness and so does not prevent the mother from assisting the progress of labor by bearing down with her abdominal muscles, but it does dull the pains to a large extent and makes them easily tolerable. At the end of the second stage, just as the baby is born, the anaesthesia is usually deepened for a few moments to the point of complete unconsciousness.

*Ether* and *chloroform* were the first agents used as anaesthetics in labor, and are still the favorites. *Nitrous oxide* (laughing gas), with or without oxygen, also gives very good results in selected cases. *Twilight sleep* is the rather fanciful name applied to a sort of anaesthesia that is produced by the hypodermatic injection of two very powerful narcotic drugs. This method, which originated in Germany, has been tried in most of the large clinics of this country, and has been almost universally discarded on the grounds that it is uncertain and not entirely free from danger. Very

recently a new method called *synergistic anaesthesia* has been devised, in which a combination of several drugs is used with satisfactory results. In all probability, however, ether by reason of its safety and simplicity will continue to be the commonest routine anaesthetic in obstetrics, as it is in surgery.

**Stitches.** As the baby comes into the world there is, of course, great stretching of the maternal tissues, and the cervix and perinaeum may both be torn to some extent. Tears, or *lacerations*, occur in a certain proportion of cases, particularly with first babies, even under the most expert care. Though the doctor can do much to minimize them, oftentimes he cannot entirely prevent them.

It is generally felt by obstetricians that cervical tears are better not repaired at the time of delivery; in many cases they do not cause trouble or require any subsequent treatment. Lacerations of the perinaeum, on the other hand, if they are more than the very slightest, ought to be sewed up at once. So when stitches are needed the doctor usually puts them in during the third stage of labor—that is, between the birth of the baby and the birth of the placenta, while the mother is still under the anaesthetic.

The fact that a woman has had stitches is not, as many people think, evidence of poor obstetrical care. On the contrary it indicates that her doctor was prompt to detect and repair those lacerations which were unavoidable. Thus he assures for his patient freedom in the future from the discomforts of a weakened pelvic floor.

The stitches used in repairing a torn perinaeum may be of a non-absorbable material, and in that case they are removed about the tenth day; or they may be of catgut, which absorbs of itself and so does not require to be taken out.

**Instruments.** This term most commonly refers to the obstetrical forceps, a pair of thin blades which fit around the

baby's head. The French have called them *mains de fer*—iron hands. That is a good comparison; the blades act much like a pair of delicate hands which are able gently to draw down the baby's head in a manner impossible for the thicker and bulkier hands of the doctor.

It has been truly said that the obstetrical forceps has done more to save human life than any other one surgical instrument. This statement applies chiefly to the baby, who might be exhausted or endangered by an unduly prolonged labor. In many cases, including some which would go on unaided to spontaneous delivery, the wise physician knows that the interests of both patients will best be served by assisting Nature in this way. Such help is most likely to be indicated in first deliveries.

At the same time patients should realize that it is very wrong to use instruments except for the definite advantage of the mother, the baby, or both. In a slow but safe and sure labor the mother sometimes grows impatient and members of her family even more so; they are then likely to urge that the doctor "do something." One should always remember that *premature* interference is dangerous, and if undertaken for the sole purpose of cutting short the mother's pains would be wholly unjustifiable. The doctor has only a single aim in view—the ultimate welfare of his two patients; he has also the technical knowledge and the calm judgment which show him clearly what ought to be done. To him, therefore, all such decisions should be left without question.

**Breech Births.** It has already been stated that in about three per cent of cases the baby lies in the womb in such a position that the buttocks are born before the body and head. In the majority of these breech presentations an uneventful spontaneous delivery is to be expected. Occasionally, however, the obstetrician will consider it best to

shorten the second stage of labor by grasping the legs of the child and so extracting it from the womb.

There are also some cases other than breech presentations in which the doctor finds that birth will be easier and safer if the feet, legs, and buttocks come first. To make this possible he may deliberately change the position of the baby in the womb. Such a procedure is known as *turning*, or *version*, and is one of the many resources by which the obstetrician is able to overcome difficulties great or small.

**Caesarean Section.** This is the operation whereby the child is delivered, not through the natural passages below, but through an abdominal incision. It is a procedure with a long and interesting history, for it has been used from ancient times and by various uncivilized races.

Previous to the days of modern obstetrics caesarean section was a method of last resort, employed only when other efforts at delivery had failed. Under such circumstances it was nearly always dangerous for the mother, because by the time the operation was undertaken she was seldom in good condition to stand it.

Nowadays caesarean delivery is not a last resort, but is on the contrary the method of first choice in certain definite type of cases; chief among these are the cases of so-called *contracted pelvis* in which the mother's bones are too small to allow the safe and easy passage of the baby. We now recognize such conditions either long before the end of pregnancy or, at the latest, after a short "trial of labor," and consequently we are able to do the operation with both mother and baby in prime condition.

So used, caesarean section has avoided much suffering and saved many lives. It is no longer a dangerous operation for the mother, and for the baby it is fully as safe as a normal delivery.

Some people believe that if a woman has one abdominal

delivery, all her subsequent children must be born in the same manner—"once a caesarean, always a caesarean." This may be true if the first operation was done for great bony contraction or for some other cause which will be present in later pregnancies just as much as in the first. Often, however, a mother who has had a caesarean section is able later without difficulty to bear other children in the natural way.

## CHAPTER X

### THE NEW-BORN BABY

#### CERTAIN MATTERS REQUIRING ATTENTION IN THE EARLIEST DAYS

The immediate care given to the baby at birth has been fully described in the preceding chapter. He is helped, if necessary, to start breathing; his eyes are cleaned and treated with an antiseptic; the umbilical cord is tied, cut, and dressed; and he is laid, well covered, in a warm and safe place. When these things are done he needs no further attention for an hour or two, beyond an occasional look to see that he is breathing properly, not bleeding from the stump of the cord, and generally all right. He is to be bathed and dressed presently, but these functions can wait until the mother receives all necessary care and the room is put to rights.

A general examination of the baby is made by the doctor some time during the first day in order to be sure that he is vigorous, healthy, and well developed.

It is the author's custom at the time of this examination to send a record of the birth to the proper local authorities. Such registration, required in many cities by law, ought never to be omitted, as it may later be of great value to the child in various legal situations.

The stump of the umbilical cord normally dries up and shrivels and between the fourth and tenth days drops off, leaving a small raw spot which heals over in three or four days more and becomes the navel.

The cord must be kept absolutely clean, since infection

might enter through it and prove very serious; it should be disturbed as little as possible. The belly-band is removed each day when the baby is washed, and is changed whenever soiled, but the gauze dressing of the cord is better left alone as long as it remains clean and dry. A moist cord should be reported to the doctor, who will give instructions about changing the dressing. After the cord drops off a little dusting powder, such as aristol, is applied daily to the raw area, over which sterile gauze is kept until healing is complete.

**The baby's eyes** will probably give no trouble if they have received the customary attention at the time of birth. They should be carefully watched, however, and at the first sign of redness, discharge, or swelling of the lids the doctor must be notified without the loss of a single hour. *Negligence in this matter might make the baby blind for life.* Proper care, on the other hand, is almost certain to avert all danger.

**The baby's head** is often more or less misshapen at first as a result of the pressure to which it has been subjected in the process of birth. Nature wisely provides that the bones are soft and loosely joined together, so that in many cases a moderate degree of squeezing and distortion of the head makes the birth easier. The remarkable plasticity of the infant's skull is shown by the custom of certain savage races who deliberately bind the heads of their babies and thus produce the most extreme deformities. There is no need to worry about natural *moulding* of the head, as it is called; it does no harm, and within a week or so the normal contour is restored.

Fairly commonly the new-born baby has a swelling in some part of his scalp, usually at the side of the head, caused by the collecting of blood and lymph at the point where the pressure was least. This disappears without treatment in a day or two.

There are two soft spots, or *fontanelles*, in the baby's skull, where bone has not yet formed. The larger of these, shaped more or less like an arrow-head, is in the mid-line a little way above the forehead, while the other, which is small and triangular, is also in the mid-line, but further back on the top of the head. The small fontanelle becomes solid and bony after about eight weeks, and the larger when the baby is eighteen to twenty months old.

The breasts of the child occasionally show a most remarkable phenomenon. They may enlarge and become hard on the third or fourth day, and then two or three days later begin to produce a little secretion which is essentially similar to milk. This so-called "witches' milk" appears in boy-babies no less often than in girls.

The treatment in such cases is to keep the breasts absolutely clean, pad them lightly with sterile cotton, and apply a firm bandage. Under no circumstances should they be squeezed or unnecessarily handled. In about a week the secretion of milk usually stops.

Jaundice is common in the new-born, occurring in nearly one-half of all babies. The color of the skin varies in different cases from the palest tinge to the most intense yellow. We do not know the cause of this condition. It usually appears between the second and fifth days, and gradually subsides in the course of a week. Such jaundice is not serious, and requires no treatment.

A slight flow of blood from the vagina, resembling menstruation, is observed in a small proportion of new-born girl-babies. Possibly this is due to some of the secretion of the mother's ovaries being absorbed by the child. Within two or three days the flow ordinarily stops without any treatment.

### THE REGULAR CARE OF THE BABY DURING THE FIRST FEW WEEKS

**General Principles.** Two things are the keynotes of the young baby's care: simplicity and regularity.

In the earliest weeks the baby's wants are not elaborate. He needs to be fed and to be kept clean, warm, and comfortable. Except for these attentions he is for the most part better left undisturbed. Many young mothers make the mistake of trying to do too much. Needless handling of the baby, for example in the way of frequently exhibiting him to admiring friends, sometimes works positive harm.

A regular arrangement of the baby's daily program is of the utmost importance. Other items will naturally group themselves around the schedule of feedings, which is discussed in Chapter XII. A fixed time must be set for weighing and bathing, for dressing, and, a little later on, for airing and for exercise. With all these things included in a regular program, the only additional attentions needed by the healthy baby during the first few weeks are the changing of soiled diapers, adjustment of the clothing as may be necessary, an occasional alteration of his position to prevent him from becoming cramped or uncomfortable, and now and then the giving of a drink of water.

**Bathing.** The bath has an important place in the daily schedule; it usually comes shortly after eight o'clock, and is followed by dressing for the day and the second feeding of the morning.

*The first bath* is given an hour or two after the baby is born, and is similar in all details to the sponge-baths of following days, with one additional feature. The skin of the new-born baby is covered with a variable amount of a cheese-like material called *vernix caseosa*. It is difficult to remove this with water, but easy with oily substances, by which the vernix is dissolved. Accordingly as a preliminary

to the first bath the baby is gently rubbed all over with warm olive oil, mineral oil, or benzoinated lard, which is then very carefully wiped off by means of a soft towel. Special attention must be paid to the folds and creases of the skin, in which the vernix collects.

A *sponge-bath* is given daily until the cord has dropped off and the navel is entirely healed. To the inexperienced woman the bathing of a baby seems at first more or less of a complicated ordeal. It becomes comparatively simple if she has all the necessary things at hand before she starts, and then, knowing exactly what is to be done, follows the plan systematically step by step.

For the sponge-bath the following articles should be ready, in a warm room where there are no drafts:

- (1) A low straight chair without arms.
- (2) A low table, large enough to hold the toilet-tray at one end with sufficient room to bathe the baby at the other.
- (3) A rubber sheet thirty-six inches square; or, if it is preferred to give the bath in the nurse's lap, a waterproof apron.
- (4) A soft old blanket.
- (5) Two cotton towels or squares of old table-cloth.
- (6) A basket or other receptacle for dirty clothes.
- (7) A covered pail for soiled diapers.
- (8) Four wash-cloths, two for the face and head and two for the rest of the body.
- (9) Two agate or enamelled basins, two-thirds full of water at a temperature of ninety-eight degrees.
- (10) A large enamelled tray, on which are collected items 11 to 18 inclusive.
- (11) A covered glass soap-dish containing a bar of plain Castile soap.
- (12) A covered glass jar containing small pieces of sterile cotton. These pieces are torn, with carefully washed hands, from a roll of cotton bought already sterilized.
- (13) A covered glass jar containing a solution of boric acid, which is made by dissolving a level teaspoonful of boric acid crystals in a cupful of boiling water.

- (14) A covered flat dish to hold the day's supply of mineral oil.
- (15) A hair-receiver or other receptacle for used cotton.
- (16) A box of fine unscented talcum powder. A piece of sterile cotton makes the best powder-puff.
- (17) A baby's hair-brush.
- (18) A cake of soap into which are stuck two dozen safety-pins of different sizes, their points being thus lubricated and kept clean. A large needle with thread should also be provided if the belly-band is to be sewed on.
- (19) The clean clothes in which the baby is going to be dressed after his bath.
- (20) Scales, if the baby is to be weighed.

With everything in readiness, the bath can be given easily and quickly. While the details of the procedure may be modified somewhat and the experienced nurse often has excellent ideas of her own on the subject, the following is in general the program for the sponge bath.

- (1) The nurse first washes her own hands thoroughly with soap and water.
- (2) If the bath is to be given in the nurse's lap, she protects herself with a rubber apron or rubber sheet, over which a soft blanket is laid. The rubber sheet and blanket are spread on a low table if she prefers to bathe the baby there.
- (3) The baby is taken up, undressed, wrapped in a towel, and laid in the blanket. The belly-band is removed, but the dressing of the cord is not disturbed unless it is soiled. This is the time of choice for weighing.
- (4) Using a soft cloth, the nurse gently washes the head and face, carefully avoiding the eyes, with water from one of the basins and a little Castile soap.
- (5) With another cloth and clean water from the other basin the head and face are rinsed off.
- (6) The head and face are then dried with a towel. They should be patted dry rather than rubbed.
- (7) The eyes are next to be cleaned. For this purpose the

nurse uses bits of sterile cotton moistened with boric acid. A separate fresh bit is used for each eye. The lids are gently wiped, and few drops of the solution may be allowed to drip onto the eye and to drain away toward the outer side of the face.

(8) The nostrils are carefully wiped out with small pieces of cotton twisted up into pledges and dipped in mineral oil. It is not necessary to clean the mouth.

(9) In a similar way the openings of the ear canals are cleaned by wiping with oily cotton pledges. This does not need to be done more often than two or three times a week.

(10) Then the baby's body is soaped, rinsed, and dried, as the head and face already have been. It is best to uncover and wash one part at a time, taking the trunk, arms, and legs in turn, as thus the baby will not run the risk of being unduly exposed and chilled.

(11) The towel in which the baby has been wrapped is now slipped out from under him, leaving him lying in the blanket, which is comparatively dry.

(12) The genital organs must next be cleaned. When the baby is a boy, the nurse carefully pulls the foreskin back, washes the organ with cotton moistened in boric acid, and draws the foreskin forward again. If the foreskin cannot be easily retracted, the doctor should be informed. In the case of a girl baby, the two lips of the vulva are separated and the cleft is washed with boric acid.

(13) A few drops of mineral oil are poured into the palm of the nurse's hand, and the baby's trunk and limbs are briskly but gently massaged. This is a better method than the use of powder for protecting healthy skin during the first two or three weeks. Later, instead of oiling, a good talcum powder may be lightly dusted over the skin after the baby is thoroughly dry; great care must be taken that he does not inhale any of the powder.

(14) If the baby has any hair, it is lightly brushed back from his forehead. He is now ready to be dressed and fed.

The *tub-bath* may be given after the navel is healed. It requires only two additional items of equipment:

- (1) A baby's bath-tub or large pan.
- (2) A bath-thermometer.

The tub is filled two-thirds full of water which must be at a temperature of exactly ninety-eight degrees. If it is colder the baby is likely to be chilled, while serious damage can result from water that is hotter, even though it may be tolerable to the mother's hands. Water which feels comfortably warm to the skin of the elbow is approximately right, but by far the best plan is to use a thermometer and be accurate.

The tub-bath differs from the sponge-bath only in the manner of soaping, washing, and rinsing the baby's body. That is to say, the fourteen steps listed in our description of the sponge-bath are all carried out in precisely the same way with the exception of step 10, for which the tub is used.

The baby may be soaped while he is still wrapped in the towel and then put into the tub for rinsing, or he may go into the tub and be both soaped and rinsed there. In the early weeks he ought not to stay in the water more than three or four minutes. He is returned to the towel and dried, and then steps 11 to 14 inclusive are carried out as in the case of the sponge-bath.

In lifting the baby (Fig. 10), the mother puts her left hand under his back, her fingers coming around the outside of his left arm and shoulder; his head, which needs support, lies against her left wrist and forearm. With her right hand she grasps his ankles. He is lowered into the tub feet first. When his buttocks are resting on the bottom of the tub, the mother's right hand is then free, but with

her left she must continue to support his back, neck, and head.

*Whenever the diapers are changed the baby's buttocks and adjacent parts are washed with soap and water, rinsed with clear water, dried, and lightly dusted with talcum powder.*



FIG. 10. THE PROPER MANNER OF LIFTING A BABY

It is particularly important to keep these portions of his body clean and dry in order to prevent chafing.

*The baby's face and hands may be sponged with tepid water when he is made ready for the night; in hot weather this may be done several times a day.*

**Weight.** The average weight of new-born babies is about seven pounds for girls and seven-and-a-half for boys; we commonly enough find individual weights anywhere

between five and ten pounds. During the first two days the baby normally loses six to ten ounces. When true nursing begins, usually on the third day, the weight starts to go up at a rate of five to eight ounces a week. The birth-weight is generally regained on the tenth or eleventh day, and should be doubled at the end of six months.

A steady gain is one of the best indications that the baby is being properly nourished—that he is receiving enough food, and is able to assimilate and use it. For this reason his weight should be followed closely. He is weighed every day for the first two weeks, and then two or three times a week for the next few months. The figures should always be recorded for the information of the doctor. It is a good plan to keep a weight-chart such as is illustrated in Fig. 11.

The weighing is to be done at the same time each day, preferably when the baby is undressed just before his bath. The weight of the blanket or towel in which he is laid should be known, and deducted from the scale-reading to give the actual weight of the baby himself. The important thing is the *increase*, the relative weight from one day to another, and so the circumstances under which he is weighed should always be as nearly identical as possible.

As regards scales, those with a spring-mechanism are not recommended, since they may get out of order. The best are the rather expensive platform-scales, with bar and weights. Old-fashioned grocery scales of the arm-and-weight type with a large scoop are also satisfactory.

**Dressing.** The baby's clothes are all ready some time before he himself arrives; their preparation has been discussed in Chapter VIII.

The main purpose of clothing is to keep the body warm. Now, while the adult body is capable of producing a good deal of so-called *animal heat*, the small baby has comparatively feeble powers of this sort. It is important, there-

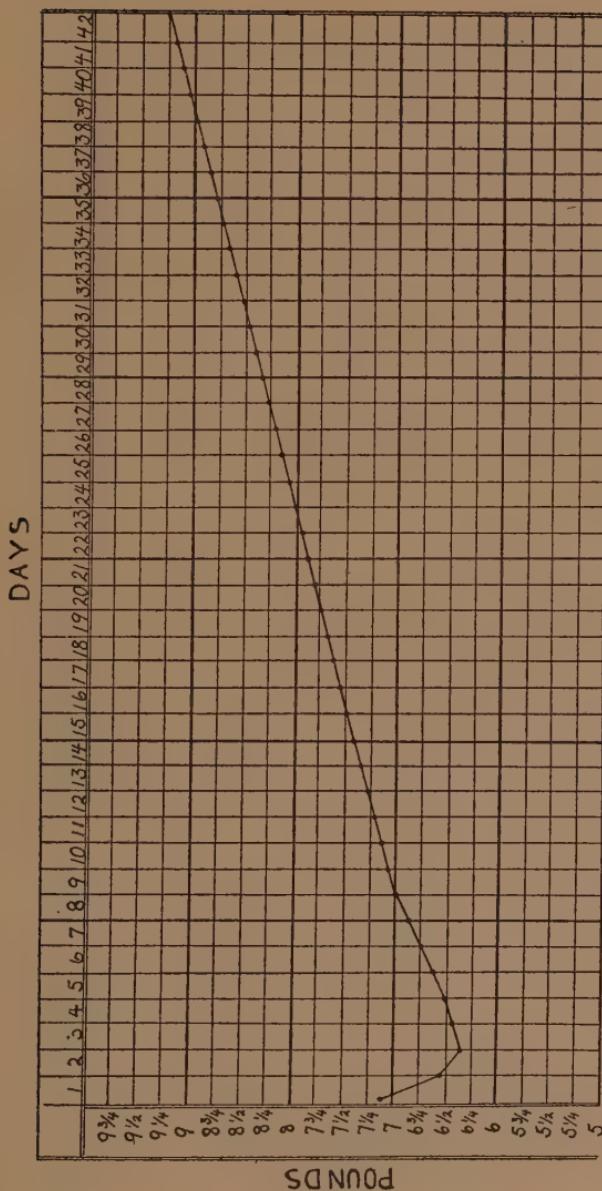


FIG. 11. A WEIGHT-CHART, SHOWING NORMAL BEHAVIOR DURING THE FIRST SIX WEEKS

fore, that he should be warm *before* his clothing is put on, and that the garments themselves should not be chilly or damp. So he must be dressed in a warm place—by choice in front of an open fire or near a radiator, if the weather is cool. His feet, which are particularly likely to be cold should be warmed if necessary by the mother's hands before the stockings are put on. All clothing must be thoroughly dry, and if the garments are chilly they should be hung for a few moments near a stove or radiator.

Important though it is to keep the baby warm enough, there is a possibility of erring on the other side. A common fault of the young mother is to overburden her baby with too many or too heavy clothes. As a result he is uncomfortable and fretful, and is likely to become delicate and susceptible to colds because his powers of resistance are weakened.

In the house the young baby wears the following garments: belly-band, shirt, diaper, stockings, petticoat, and dress, which are put on in the order given. There should be a complete change of clothing each morning after the bath, but except in the case of the diaper there is at first no need for further changes during the twenty-four hours unless the garments become soiled. At the age of about four weeks it is wise to have an entire change of clothing at night, as well as in the morning, and then a nightgown is substituted for the day-time dress. For out-of-door wear there is considerable variety of outer garments: shawls, squares, coats, bonnets, and mittens.

It is not easy to dress a baby held in the lap. The best method is to lay him on a bed, or on a low table covered with a soft blanket. All clothing should be in readiness before dressing is started.

The *abdominal band*, or *belly-band*, is put on first. A flannel band is used until the baby is about two weeks old,

and holds the umbilical dressing in place as long as the navel is unhealed. It encircles the abdomen, but should not come up too high under the arms, or low enough to interfere with the movements of the thighs. The aim is to give the abdomen firm support without constricting either abdomen or chest. The flannel band is better not pinned; unless provided with tapes, it is sewed on each day, care being taken that it lies smooth and unwrinkled. After the second or third week it is replaced by the knitted band with shoulder-straps.

The *shirt* with long sleeves and high neck is the next garment to be put on. It is buttoned or tied in front, and should be pulled well down around the baby's hips.

Then comes the *diaper*. If this is of ordinary size, about eighteen inches square, the best manner of putting it on is as follows. The diaper is folded through the middle so as to make a rectangle of double thickness nine by eighteen inches. The baby is laid lengthwise on this, with the upper edge of the diaper a little above his waist. The lower end is then brought up between his thighs and over the front of his abdomen. The next step is to secure the diaper with large safety-pins. On each side the front and back corners are fastened together, the back overlapping the front. Just above each knee the front and back edges are pinned together, so that the diaper encircles the thighs like the legs of a pair of short trousers. To keep it from slipping down it is then fastened in front and in back to the shirt. It must never be tight, and all bunchiness is to be avoided, particularly between the thighs.

Much laundry-work will be saved if small thick pads of cheap absorbent material are placed inside the diaper to receive the bowel-movements. For this purpose the padding of the commercial menstrual napkin is excellent. Rubber drawers or diapers are distinctly inadvisable, since they

exclude air from the skin and keep the parts excessively moist. Under special conditions, as on a journey, the temporary use of such waterproof garments may be allowed.

*Stockings* are not always necessary. It is probable that the baby's feet will be kept warm enough, indoors at least, by the wearing of long clothes. If they tend to get cold, however, or if he goes out on cool days, he should wear soft knitted or woolen socks, which are put on after the diaper.

The next article is the flannel *petticoat*, or "gertrude." This is sleeveless, and may open down the back, fastening with buttons or tapes, or may open at the top, with buttons or snap-fasteners on the shoulder-bands. In the latter case it should be pulled up over the baby's feet, and never put on over his head. In very warm weather the petticoat need not be worn.

Finally, there is the *dress*, or overslip, which has sleeves and fastens in the back. The baby is now fully dressed for the house. As he is laid down in his crib, it is a good plan to smooth out his clothing behind so that it is not wrinkled or bunchy underneath him.

The *nightgown* fastens in back, and is put on like the dress. For a baby who is inclined to kick his clothes up, it is advisable to have some way of fastening the bottom of the nightgown. A pucker-string in the hem accomplishes this purpose; equally well, the bottom of the gown may fold over and be held with buttons or snaps.

Of baby's *wraps* for out-of-doors the mother has a considerable choice. In the earliest weeks perhaps nothing is better than a soft blanket about thirty-six inches square, which can be wrapped around the baby's body and brought up to form a sort of hood for his head, thus taking the place of both coat and bonnet.

The baby's *laundry* is done often enough to keep him

constantly supplied with fresh clean garments, but if his wardrobe is sufficiently large there is no need for the daily washing of anything except the diapers.

All clothing is washed in hot soap-suds and is then thoroughly rinsed, as any soap remaining might irritate the delicate skin. No starch, bluing, or soda is to be used. The clothes are best dried in the open air and sunshine. They are ironed smooth to avoid all creases.

Diapers must be washed daily. As soon as one is taken off it is carried into the bathroom, and stools are removed with a scraper. The diaper is immediately rinsed, and is then put into water to soak until the regular time for washing. Soiled diapers should never be allowed to dry. Once each day those that have accumulated are washed in hot soap-suds, rinsed in clear water, boiled for thirty minutes, and rinsed twice more. They are then thoroughly dried and ironed.

**Exercise.** From the very start the baby needs exercise no less than the older child or adult. During the earliest weeks a healthy infant will provide enough of this for himself without any help, partly by crying and partly by kicking his legs and throwing his arms about. It is only necessary to see that he has freedom of movement and is not hampered by tight garments or heavy bed-clothing.

Lying too long in one position is bad for the baby, especially if he is not very strong. So, until he is able to move himself about, he ought occasionally to be turned or shifted in his crib, or taken up and put down again in an altered position. He should sleep generally on one side or the other rather than on his back, and should now and then lie on his stomach.

Beginning in the fourth or fifth week, the mother ought several times a day to take the baby in her arms, carefully supporting his head and back, and walk slowly about the

nursery with him for ten minutes. The movements of her body are in part transmitted to his and constitute a sort of passive exercise which is peculiarly valuable to him. Babies should not be rocked; the form of "mothering" just described is preferable by far.

At the age of six weeks the baby may be allowed once a day to have a further opportunity for exercise. He is undressed except for diaper, shirt, and socks; is laid either on a bed or on a clean blanket spread on the floor, in a warm room which is free from drafts; and is then left to his own devices for half-an-hour. This chance to use his muscles without restraint is thoroughly enjoyed by the baby, and is very beneficial to him.

**Airing.** An abundance of pure fresh air is hardly less essential than food. Far from causing colds, it does much to prevent them. In addition, sunshine is a better germ-killer than any drug.

In warm weather the baby may begin to go outside when he is a week old. After the second week there is no reason why he should not sleep out-of-doors in his carriage the greater part of the day, so long as the weather is fine and warm. His eyes must be protected from too bright a light, and the carriage should be covered with netting to keep off insects.

In the spring or fall he may be taken out at the age of one month, and in winter at the age of six or seven weeks. The vigor of the baby and the temperature are both to be considered. Extreme cold, high wind, rain, or snow will usually make it inadvisable for him to have his airing outside. In any case, except during the summer, he should become very gradually accustomed to going out, the daily excursions being short at first. Plenty of warm clothing and covering are necessary, and he must always be taken out as soon as he is ready, so that he will not get overheated

in the house. Warm hands and feet, a healthy pink color, and a tendency to sleep show that he is not chilled. His lips should never be allowed to become blue.

When weather-conditions are unfavorable the baby may be given his daily airing in the house. He is dressed as though for out-of-doors, put into his carriage, and left, out of all direct drafts, in a room with enough windows open to insure free circulation of air.

**Sleep.** During the first few weeks the normal baby sleeps twenty or more hours each day—nearly all the time when he is not being bathed, dressed, or fed. His sleep is quiet and peaceful, but light. Nevertheless there is no need to hush all noise in the house for fear of waking him; it is better for him to become accustomed to sleeping in the midst of ordinary sounds. Generally he will awaken only from hunger or discomfort.

Training in proper habits of sleep should begin at birth. After each feeding the baby is put down while still awake, and is then left to go to sleep of his own accord. He should never be rocked to sleep, or given anything to suck while in his crib. With a quiet shaded room, a warm bed, dry comfortable clothing, a satisfied appetite, and a good digestion, the ordinary baby may cry a little, but will not be long about going peacefully to sleep. According to the schedule of feedings, he is expected to sleep for two or three hours at a time throughout the day, and for a longer period during the night. It is not difficult to train him into a regular observance of this program.

**Stools and Urine.** At birth the baby's intestines contain a certain amount of dark green material, tarry and thick, called *meconium*. Some of this is usually passed just after birth, and the rest at intervals during the first two or three days. About the fourth day the stools begin to alter in appearance, until at the end of a week they are

of a bright yellow color, and smooth and pasty like gruel. The normal baby will have one, two or three such stools daily during the first six or eight weeks.

The stools must be carefully watched, since their character affords a good deal of information about the state of the baby's digestion. If they are green, or are thin and watery, or contain mucus, or exceed four a day in number, or appear in any other way abnormal, the condition ought to be reported to the doctor, and a stool should be saved (in a diaper) for his inspection.

The baby ordinarily first passes urine at the time of birth. In the early months the bladder is emptied, on the average, fifteen to eighteen times a day.

**Crying.** A certain amount of crying is normal in infancy, and in the first few weeks is highly desirable. It affords the baby the best possible means of muscular exercise. It also develops his lungs, which previous to birth were not used at all, and makes them better able to perform their new duty of respiration. In this latter way one month of moderate daily crying accomplishes more than might a whole year of simple breathing.

Some babies naturally cry more than others, and the mother will soon be able to judge what can be regarded as normal and usual in the case of her own child. At least one good lusty cry each day, for no particular reason, is to be expected and need cause no concern.

On the other hand, crying is the baby's only means of protest against things to which he objects, and he uses it to indicate discomfort of any sort. There is generally a reason for prolonged or excessive crying by a healthy baby. This may be hunger, thirst, gas, cold, bunchy clothing, pricking pins, wet diapers, or cramped position.

The sick baby seldom cries vigorously, unless he is in acute pain. His cry is more like a feeble moan. The cry of the baby with indigestion is fretful, whining, and continuous.

It is easy to allow the habit of unnecessary crying to develop, with results disastrous to the comfort of the household. A baby forms habits readily, and if he finds that crying secures him extra attention, he will soon demand what is entirely unreasonable. Even a very young baby can show violent temper when his desires are not gratified.

When the healthy baby cries, the mother should first assure herself that he is not suffering from any actual discomfort. That being ascertained, he is then allowed to "cry it out," even though this may take an hour or more. Ordinarily such an experience will not repeat itself many times. There need be no fear that he will rupture himself by crying. He should not be taken up, and should most certainly not be nursed except at the regular times of feeding. "Pacifiers" are distinctly harmful; they establish a bad habit, and with prolonged use are likely to deform the baby's jaws. Soothing syrups are nothing less than diluted poison.

**The Nursery.** The baby should have his own room whenever possible, which may be near to or communicate with the bed-chamber of his mother. Since during his first year he will spent at least four-fifths of his time in that room, no pains should be spared to make it a healthy as well as comfortable place.

*Good ventilation* is of the first importance. The room must be not less than ten feet square, and should have two or more windows. The aim is to afford at all times an abundance of fresh air, without drafts. On warm calm days there is no objection to keeping the windows wide open, provided they are properly screened against flies and mosquitoes. For cool or windy weather each window should be equipped either with a regular ventilator, or with a window-board about six inches wide which can be inserted under the lower sash to allow the entrance of outside air between the lower sash and the upper.

At least twice a day, including once in the evening, the nursery must be thoroughly aired by leaving all windows wide open for a few minutes. While this is done the baby may be taken into another room if the weather is cold; before he is brought back his own room must be restored to a proper temperature.

The nursery ought not to be used for cooking or for the drying of clothes. Gas-light and oil-lamps are objectionable because they consume the oxygen of the air.

As regards the *temperature*, the main point is to keep it even, for any sudden change is harmful. An overly hot nursery is very likely to make a delicate baby. Extra warmth, when needed, is better given by clothing, covers, or hot-water bottles than by raising the temperature of the air. As a general thing the room is kept up to seventy-two degrees by day and sixty-five degrees at night during the first six weeks. The equipment of the nursery should include an accurate thermometer. An open grate-fire is the ideal method of combining heating with ventilation. If other forms of heating are used, it is well to guard against undue dryness of the air by keeping a small pan of water on the register or radiator.

*Light* is also important, for babies, like plants, do not thrive in the dark. The nursery should be so placed as to receive the sunshine for several hours each day. At the same time there must be provision for screening the young baby's eyes from all glare and from direct bright light, both natural and artificial. The windows are best equipped with two sets of draw-shades, one light-colored and one dark, and with simple muslin curtains attached to the lower sash.

The *walls* and *floor* are arranged with a view to keeping them clean with the least effort. Bare plaster is preferable to wallpaper; there should be no hangings or other dust-catching ornaments. The best floorings are hard wood or

linoleum, over which one or two light rugs may be laid. A carpet is undesirable, as it always harbors dust and dirt.

The *furniture* of the nursery will naturally vary with the preference and the purse of the mother. It should in general be simple, light, and clean. Apart from the baby's bed, the following articles will prove almost indispensable: a chest of drawers; two low straight chairs, without upholstery or arms; a fair-sized low table, such as the ordinary kitchen-table cut down to the height of two feet; and a three-fold screen.

The baby should always sleep alone. He may have a brass or enamelled iron crib from the start, or may use a bassinet for the first few weeks. Rocking cradles are inadvisable.

A firm hair or felt mattress is the best, and though a pillow is not necessary, there is no objection to a small one stuffed with hair. The mattress is protected by a rubber sheet; over this are spread a thin mattress-pad and then a cotton sheet, on which the baby lies. Cotton is a more satisfactory material than linen for his sheets, because it is warmer. He is covered with another sheet and one or two light blankets or a "comfortable." To keep the coverings over a restless baby it is better not to tuck them in underneath the mattress, since that method draws them over him too tightly; they should rather be pinned to the mattress at each side with the very large safety-pins that are used for horse-blankets. At least once daily the sheets will have to be changed and all bedding must be aired. If a bassinet or basket is used during the early weeks, its sides are lined with padding made by sewing cotton batting between two layers of cloth.

The baby-carriage should be light and simple in construction. The essential features are rubber tires, a brake that locks the wheels, good springs, and a hood or top which

can be swung toward either the foot or the head of the carriage, so as to protect the baby from wind or glare at any angle. Mattress, sheets, and coverings are arranged for the carriage, whenever the baby sleeps in it, just as they are for the crib.

#### HEALTH-INSURANCE FOR THE BABY

As was mentioned in Chapter I, the effort to promote baby welfare is one of the most important lines of preventive medical work. It is estimated that of the 200,000 babies under one year old who die each year in this country fully one-half die from causes that are preventable. If all mothers knew how to give their babies ordinary everyday care of the right sort, this appalling and unnecessary loss of life would stop.

The *art* of motherhood has been cultivated from the earliest days of the race. The *science* of motherhood is a comparatively recent development. And upon the science depends our hope of saving the babies. Women need training in order to become efficient mothers no less than men do for the efficient performance of their daily tasks. The knowledge required is not elaborate or difficult to get, but without it the mother is working under a handicap and the baby is defrauded of his proper chance.

The mother must be very slow in allowing herself to be guided by the advice of other untrained women, however well-meaning they may be. The fact that a woman has had several children does not necessarily qualify her as a competent adviser. The trained nurse, on the other hand, is able to give a great deal of valuable information about the details of the baby's everyday care.

It is beyond the limits of this book to offer more with regard to the baby than the simple instructions embodied in the present chapter and in Chapter XII, which apply

to the normal child during the first five or six weeks. There are, however, several reliable and helpful books on the general subject of the care and feeding of babies of all ages, and to these the mother is referred for further information.

The reading of such a book will teach her much that is of interest as well as of practical assistance in the performance of her new duties. It must be remembered, however, that no matter how well instructed she may be, the mother is never as good a judge of either sickness or health as is her physician. Accordingly he should be consulted for any except the most minor disorders, and consulted promptly, since it is always easier to prevent than to cure. In fact, the better plan is to consult him regularly *for health*. Monthly conferences with the doctor throughout the baby's first year will settle most of the young mother's problems and give her a degree of comfort and assurance worth many times its cost. In no other field does preventive medicine yield more definite and satisfactory results.

## CHAPTER XI

### THE LYING-IN MOTHER

#### IMMEDIATE CARE

As soon as the baby is born he is given the care described in Chapter IX, which is all that he requires for an hour or more. So, when the placenta has been delivered and labor is finished, the doctor and nurse are free to attend to the further needs of the mother.

**To make her clean and comfortable** is their first task. This involves moving her about to some extent, and the intelligent coöperation of the patient is very desirable. She must remain *absolutely passive*, not attempting to help by the use of her own muscles, but allowing her attendants to do all the work of shifting her. As far as possible she should keep her legs extended and close together, so as to prevent air from getting into the womb.

The doctor first washes the vulva with sterile water or an antiseptic solution, and applies a sterile absorbent pad. The patient is then rolled over so that she lies on her right side at the right edge of the bed; soiled bed-sheets and rubber sheets are slipped out from under her, and her night-gown, if soiled, is removed. The nurse quickly washes the mother's back and buttocks. The abdominal binder is next laid around her left side and back, and to it the vulvar pad is pinned behind.

If the patient is to remain in the bed in which she has been delivered, as is usually the case when labor is conducted in a private house, the nurse at this point makes up the left two-thirds of the bed with a clean sheet. The

mother is then rolled over onto this sheet, and lies on her back in the middle of the bed. The binder is brought from behind around her right side, and its ends are pinned together in front, beginning at the bottom; it should be snug, but not tight. The vulvar dressing is now pinned to the binder in front. A clean night-gown is put on if necessary, the right third of the bed is made up, and the patient is covered with sheet and blankets.

Finally, all soiled sheets, clothing, dressings, and utensils are promptly removed from the lying-in room. The usual method of disposing of the afterbirth is to wrap it in newspapers and burn it.

A period of complete rest is now needed by the mother; and, indeed, she has well earned it. For the first few hours she must remain on her back, entirely relaxed. If any pillow is used, it ought to be small and hard.

The room should be well ventilated and cool. The mother is kept warm by blankets, and a hot-water bottle wrapped in a towel may be applied to her feet. A hot drink such as tea, malted milk, or gruel is often very comforting at this time. Many women feel cold just after labor; a few experience a definite chill, which is of no significance and lasts only a brief time. All the treatment needed is to keep the patient comfortably warm by the usual means.

The husband may be permitted to see his wife for a few minutes before she settles down to rest, but other visitors must at first be excluded from the mother's room. The surroundings are kept quiet, the curtains are drawn, and the patient is allowed to sleep as long as she will.

**Bleeding from the womb** occurs normally, in gradually diminishing quantity, for several days after delivery, but even in the beginning the amount of this flow should not exceed that of a fairly profuse menstrual period. Occasionally, however, there is excessive bleeding in the first

few hours. This is fortunately not a common accident, and is unlikely to occur at all if there are no signs of it immediately after labor, while the doctor is still present. Nevertheless the mother's attendant should keep the possibility of haemorrhage in mind, and should from time to time during the first four or five hours inspect the vulvar pad to observe the amount of the flow. She should also understand what to do in event of profuse bleeding pending the arrival of the doctor, who ought always to be sent for if the nurse feels that the mother is bleeding too much. All soiled pads should be saved for his inspection, so that he may himself judge the amount of blood lost.

The proper treatment is not difficult; any intelligent person can carry it out. The usual cause of haemorrhage is relaxation or softness of the womb, which ought to be firmly contracted, and the best means of stimulating contraction is massage. After delivery the womb is easily felt as a large mass or "lump" in the lower part of the mother's abdomen. So loose is the recently stretched abdominal wall that the organ can be grasped through it by the nurse's hand, her thumb in front and her fingers extending over the top of the womb and down behind; this is most readily done with the nurse's right hand as she stands on the mother's left side. Having grasped the womb thus the nurse proceeds to squeeze or "knead" it, and usually has the satisfaction of feeling it become hard and firm as a result. When this happens, all excessive bleeding stops.

Most cases of haemorrhage after childbirth can be controlled in the manner described, without further treatment. There are, however, other measures that may be ordered by the doctor when he comes. An ice-bag is occasionally placed over the womb; the foot of the bed is often raised; and sometimes the baby is put to the breast, since his sucking stimulates the womb to contract. The

doctor has also at his disposal both drugs and surgical means for the control of bleeding, so that there is little fear of this complication proving serious provided that, when it occurs, it is immediately recognized and treated.

A patient who has shown any tendency to bleed must be watched by the nurse with redoubled care for some hours after all haemorrhage has stopped. Not only should the vulvar pad be frequently inspected, but at the same time the womb ought to be felt to make sure that it remains firm and hard.

**The mother should empty her bladder** within ten hours after delivery. She often does not feel the desire to do so because the relaxed parts permit considerable distention of the bladder without discomfort, but neglect in this matter is unwise and might have harmful consequences.

Quite commonly the patient at first finds it difficult to pass water, partly because the organs are stretched and relaxed, and partly because she is not accustomed to the use of the bed-pan. There are various expedients that can be used to overcome this difficulty. A hot-water bottle placed over the lower abdomen may be sufficient. A little steaming water in the bed-pan often accomplishes the purpose. Occasionally the sound of running water from a near-by tap acts by suggestion. The doctor or nurse can always empty the bladder, if necessary, by drawing the urine off with a catheter, but before resorting to this method every device should be tried to enable the patient to pass water in the natural way.

#### THE FIRST SIX WEEKS

**Changes in the Mother's Body.** By the end of six or eight weeks after delivery the mother's body has usually returned to the healthy non-pregnant condition. It cannot be said that the indications of pregnancy and child-

birth entirely disappear, for some of them are permanent and will always be discoverable by careful examination. But a series of changes goes on generally the reverse of those occurring in pregnancy (except for the breasts, in which the changes are still progressive), until, after what is really a remarkably short period of time, the organs and tissues are normally restored to their former state.

The *changes in the womb* are most conspicuous. Just after delivery the organ weighs approximately two pounds; it is about eight inches long, and is felt in the lower abdomen as a mass extending up nearly as high as the navel. By the end of the first week it weighs only one pound; on the eleventh or twelfth day it has diminished in size so that it lies behind the pubic bones and can no longer be felt through the abdominal wall; and in seven or eight weeks it returns to its original weight of two ounces and length of about three inches.

The name *involution* is given to the whole series of restorative changes by which the womb and other parts of the mother's body return to the non-pregnant state. Obviously these are radical changes; and while they are going on it is highly important that the mother should have the best possible care so that everything may progress favorably and result in perfect health. The process of involution is favored by nursing.

Immediately after delivery the muscle-fibers of the womb contract strongly, closing the openings of the blood-vessels and preventing any abnormal amount of bleeding. After first confinements this muscular contraction is generally steady and painless. There are likely to be contractions of a more or less intermittent character following subsequent confinements because the uterine musculature no longer possesses the same degree of steady tone as before, and these contractions may give rise to so-called *after-pains*,

which are of fairly common occurrence in women who have previously had babies. The pains resemble those of labor, and are sometimes severe enough to require medicine for their relief. They begin usually within the first twenty-four hours and last one to several days, though they are seldom very annoying for more than a day or so. After-pains often become more acute each time the baby takes the breast because irritation of the nipples causes a reflex stimulation of the uterus.

The separation and expulsion of the afterbirth leaves the inside surface of the womb raw, like an open wound. It is on this account that we are so particularly careful about cleanliness during labor and throughout the lying-in period, since the raw lining of the womb might easily become infected, with serious consequences. As might be expected from any open wound, there is a discharge from the uterine lining; it is known as the *lochia*. For the first day or two the lochia are red, consisting of almost pure blood intermingled with small clots. Soon, however, the flow assumes a dark maroon color, and becomes thick and creamy. After the first week the lochia begin to get thinner and whiter, and usually they cease altogether sometime between the fourteenth and twenty-first days. In some cases there is a considerable return of lochia when the patients first get out of bed, and in others a discharge persists for several weeks; such happenings suggest that there may be some slight trouble which requires the doctor's attention. The healthy lochia have a characteristic odor, and any abnormality in this particular, as well as in the color or amount of the flow, is a thing which ought to be recognized.

The *time when menstruation will return* is always more or less uncertain. If a woman does not nurse, her periods are likely to begin again within six or eight weeks after delivery.

The nursing mother, on the other hand, is much more variable. She may be regular from the very first month, or she may go through the whole of lactation without a single period. In the majority of cases there is some re-appearance of menstruation while nursing is still being continued, before the end of six months more commonly than not, but the periods are often irregular until the baby is weaned. It is not unusual for the first flow to be rather profuse. In connection with the return of menstruation we might mention the fact that many women who prior to pregnancy suffered severely each month find themselves cured of this trouble when the periods are resumed after childbirth.

The possibility of another conception exists at any time after the birth of a baby. While the mother is nursing and particularly if her menstruation has not reappeared another pregnancy is without doubt less likely to occur, but even under such conditions there is always the chance of a mature ovum becoming fertilized and implanted in the womb.

The *ligaments of the uterus*, the *abdominal wall*, and the *pelvic floor* participate in the process of involution, which is not limited to the uterus. All these structures have undergone marked changes in the course of pregnancy, and must go through a series of restorative changes after delivery in order to return to their normal non-pregnant condition. Their perfect involution is most important, since it insures proper support for the abdominal and pelvic organs and prevents a large number of minor ills.

*Free perspiration* is a common phenomenon of the first four or five days of the lying-in period. The mother often sweats profusely, especially during sleep—sometimes so much that changes of bed-linen are required. This is a favorable sign, for it means that she is getting rid of waste-material. Another evidence of good elimination is seen in

the *increased activity of the kidneys*, which at first secrete daily nearly a pint of urine more than is usual for the non-pregnant woman. The irritability of the bladder characteristic of both early and late pregnancy is, of course, no longer a symptom.

A striking *loss of weight* occurs regularly in the lying-in days, and is due mainly to free elimination of fluid in the perspiration, urine, lochia, and milk. We saw in Chapter IV that during pregnancy the mother's body, independently of the contents of her womb, usually gains about ten pounds. This and more is lost, as a rule, during the first two weeks after delivery. The loss is greater in fat than in thin women, and in those who nurse their babies than in those who do not. After the second week the mother gains again, and by the end of six or eight weeks her weight should be no less than it was before pregnancy. Many women continue to put on weight after their babies are born and become heavier than they ever were before.

**The Length of Time in Bed.** Long-standing tradition allows the normal mother to get up on the tenth day after delivery. There is, however, a good deal of difference of opinion among doctors in this matter, as well as of custom among patients. Some medical men have advocated getting up on the second or third day. The results of such a policy, as shown in women of the immigrant class who sometimes refuse to stay in bed for more than a few hours, have proved it to be decidedly risky from the viewpoint of the mother's future health. On the other hand, there are conservative physicians who prefer to keep their maternity patients in bed for several weeks.

After all is said, we must realize that this is a subject upon which no set rule can be laid down, since naturally labors differ in severity and patients in recuperative power. There is no doubt that conservatism is in general the wiser course.

The writer believes firmly, with an eye to end-results, that the mother will nearly always benefit by keeping her bed for the first three weeks. It is often difficult to persuade a patient of the need for this, since as a rule she feels so well at the end of a week or so that she becomes eager to get up. But when one reflects upon the very striking changes that are going on in the mother's body, it is obvious that no small harm might be wrought by premature exertion and ill-judged activity.

We will suppose, then, that our patient is going to spend three weeks in bed. During the first twenty-four hours she makes no attempt to use her own muscles. She lies flat on her back, possibly with a small hard pillow under her head, for the first three or four hours. After that an ordinary pillow is allowed, and her position may be shifted by her attendants to one side or the other as comfort requires. On no account may she sit up to use the bed-pan.

On the second day the mother begins gradually to move herself about, lying in any position that she likes. From now on she should spend an hour each day, preferably in four periods of fifteen minutes each, lying flat on her stomach; the effect of this posture is to keep the womb from tending to tip backward. The second day also marks the start of the easiest bed-exercises in appropriate cases.

At the end of a week the patient is propped up with three or four pillows or a bed-rest several times throughout the day, perhaps when she is eating her meals or desires to read. In the intervals she should have rest and complete relaxation. It is always wise, however, for her to avoid sleeping too much in the day-time, in order that she may be able to sleep well at night.

The writer usually sends his hospital patients home at the end of the second week. In preparation for the motor-

ride the mother is allowed out of bed in a chair for two periods of fifteen minutes each on the twelfth day, and for half-an-hour morning and afternoon on the thirteenth. She is helped in moving between the bed and the chair.

During the third week the patient spends all her time in bed, but is permitted to get up, with assistance, to attend to the needs of the toilet. No restrictions are placed upon her activity in bed.

In the fourth week the mother gets up, starting with an hour or two in her dressing-gown, and progressing until by the end of the week she spends the greater part of the day fully clothed. Even in this fourth week it is better for her largely to confine herself, not necessarily to the bedroom, but at least to the upper floor of the house, for two reasons: first, frequent going up and down stairs involves a muscular strain greater than is yet advisable; and second, experience has shown how unlikely the housewife is to refrain from plunging into domestic tasks once she has access to her kitchen and other centers of household activity.

After the end of the fourth week there need be no set rules for what the mother may do. Let her remember that although she probably feels very well indeed she is not yet in a position to presume upon her strength, and that by erring at first on the side of doing too little she will unquestionably gain in the end. The immediate recovery after childbirth is quick, but many women fail to realize that the ultimate complete recovery is a matter of weeks. During this whole period the watchword should be *slow but sure*.

**The Lying-in Room.** The surroundings in which the mother is to recuperate from the strain of pregnancy and labor should be as nearly ideal as possible. A bright clean room with plenty of ventilation is essential. Cool fresh air will do the patient no harm, ancient prejudice to the

contrary notwithstanding; she herself can always be kept warm enough by suitable clothing and coverings.

Her room must be quiet, since rest is an important part of her treatment. For this reason the baby, during the first three weeks at any rate, occupies a separate apartment. Household cares should not be allowed to obtrude upon the mother. Visitors, excepting members of the family, had better be forbidden altogether during the first week. After that there can be no objection to short visits from cheerful friends. Nothing, however, is more fatiguing for the lying-in patient than to have her room made all day long a center for neighborhood gossip.

**The Mother's Diet.** In the old days it was the custom to keep the lying-in mother on a very scanty diet, since it was believed that fever and other complications might result if she were given ordinary food. We know now that this idea is quite without foundation. The modern practice is to follow very largely the dictates of the patient's appetite. The total quantity of food needed while she is lying quietly in bed is, of course, not so great as when she is leading an active life; hence overeating should be avoided. Any woman who gets little or no exercise is likely to feel torpid and uncomfortable if she eats too much. There is no reason, however, why the mother should not have a simple mixed diet, at least after the first day or two, in moderate amount.

*During the first twenty-four hours* liquids, in any quantity desired, will be sufficient for her needs. She may have hot or cold milk, malted milk, cocoa, broths, simple soups, thin gruel, and weak tea. An abundance of water is very beneficial, both now and later.

*On the second day* the mother has three regular meals, in which are included soft solid foods such as well-cooked cereals, toast or milk-toast, crackers, thin bread and butter,

soft-boiled, dropped, or scrambled eggs, oyster stews, custards, and ice-cream. Between meals liquids, particularly milk and water, are taken.

*On the third and subsequent days* the mother's appetite, which at first was probably not very keen, improves and may be followed as a general guide in selecting her menu. Her food should be simple, nutritious, and well-cooked. The only precautions to be observed are reasonable moderation in quantity and the avoidance of articles known to be generally indigestible or to disagree with the individual patient. Between the regular meals she should drink plenty of water, at least eight glassfuls a day, and should have the equivalent of a daily quart of milk, of which part may be given in the form of egg-nogs, milk-shakes, or chocolate. The usual custom is to serve drinks of this sort in the middle of the morning, about four o'clock in the afternoon, and late in the evening.

The diet prescribed for the nursing mother after the lying-in period will be discussed in Chapter XII.

**Abdominal Exercises.** Permanent relaxation of the abdominal wall not only produces an unsightly form, but is responsible also for backache and various other discomforts. It is therefore very important to make sure that the abdominal muscles regain their normal strength after pregnancy. In many cases nature will accomplish this restoration unaided, particularly if the mother spends the proper length of time in bed and does not attempt the premature use of the temporarily weakened muscles. The writer believes, however, in common with many other physicians, that selected exercises will help in the process of recovery.

No fixed rules can be laid down in regard to such exercises; they must be adapted by the doctor to the individual patient, with due consideration of her strength, the tone of her muscles, and the condition of her perinaeum. The

following program might be followed by an average normal patient who has no stitches. It provides a carefully graded series of gymnastics to be performed twice daily, night and morning.

For all of these exercises the mother lies flat on her back without a pillow, her legs together and her arms at her sides. Each movement should be made slowly, but with considerable muscular force.

*Exercise 1 (Fig. 12)* is started after the first twenty-four hours and continued for seven days. The head is bent



FIG. 12. CHIN-TO-CHEST EXERCISE

forward until the chin touches the chest, and is then lowered to rest again on the bed. This is done twenty-five times.

*Exercise 2 (Fig. 13)* is started after the second twenty-four hours and continued for eight days. The arms are carried straight out from the sides, then raised above the patient's head to touch the head of the bed, and finally brought directly back to their original position at her sides. This is done ten times.

*Exercise 3 (Fig. 14)* is started after the fifth day and continued for seven days. One leg is raised from the bed, the knee being allowed to bend, until the thigh is brought as close as possible to the abdomen; the limb is then extended again. This movement is performed first with one leg and then with the other, four or five times with each leg in the beginning, and ten times as the patient grows stronger.

*Exercise 4 (Fig. 15)* is started after the eighth day and continued for six days. The movement is the same as in Exercise 3, except that it is performed with both legs

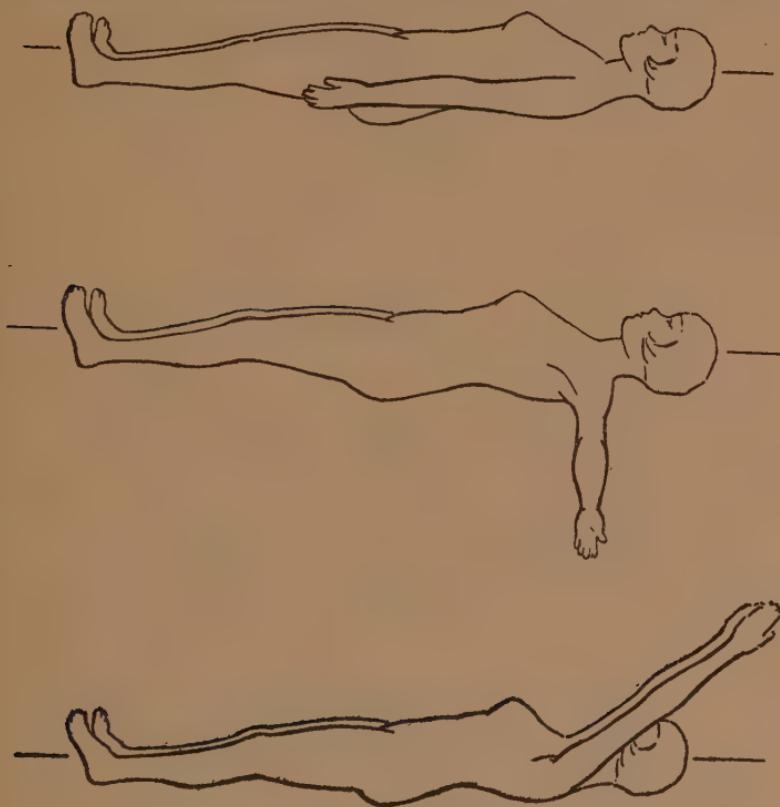


FIG. 13. ARM EXERCISE

simultaneously. This is done four or five times at the start, and later ten times.

*Exercise 5 (Fig. 16)* is started after the tenth day and continued through the third week. Both legs together are raised straight up in the air, the knees being kept stiff,

and are then slowly lowered onto the bed. This is done ten times.

*Exercise 6 (Fig. 17)* is started after the twelfth day and continued through the third week. With shoulders, elbows, and heels on the bed, and without the use of the



FIG. 14. ONE-LEG EXERCISE, WITH KNEE BENT



FIG. 15. TWO-LEG EXERCISE, WITH KNEES BENT

hands, the buttocks are raised as high from the bed as possible, and then lowered again. This is done ten times.

*Exercise 7 (Fig. 18)* is started at the end of the second week and continued through the third. The body is raised from the lying to the sitting posture without the assistance

of the arms, and is then not allowed to fall back by its own weight, but is slowly lowered to the original recumbent position. This is done five times at first, and later ten.



FIG. 16. TWO-LEG EXERCISE, WITH KNEES STRAIGHT

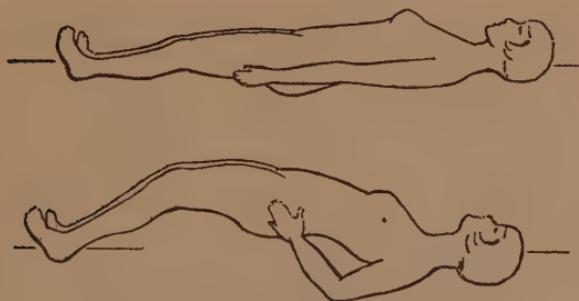


FIG. 17. BACK EXERCISE

*Exercise 8* is started after the second week and continued through the third. It is intended particularly to develop the pelvic floor. Slowly and with the greatest possible force the patient makes the same muscular effort that she would make if she were trying to retain gas or a loose

movement in the rectum. This is done twenty times, at a rate not faster than five times a minute.

The exercises just described, while they make up a representative program, would certainly not be suitable for all cases. Accordingly each patient ought to consult her own doctor about this matter; he will often feel that she should do less, and sometimes that she can do more, than we have outlined here.

After the third week, when the mother is up and about, a proper amount of general exercise will usually take the



FIG. 18. LYING-TO-SITTING EXERCISE

place of these special abdominal gymnastics. However, in cases in which the abdominal wall and pelvic floor do not quickly regain their normal strength it may be advisable to continue the last four of the above exercises, possibly with the addition of certain others, for a period of months.

**Abdominal Binders and Corsets.** It is an almost universal custom to give the mother a snug abdominal binder as soon as labor is over. This she ordinarily wears for five or six weeks, replacing it at the end of that time with corsets.

To the binder are popularly ascribed virtues which in reality it does not possess. It is supposed to assist in preserving the "figure," and to prevent the prominence of the upper abdomen known as "high stomach." In point of fact it can do little, if anything, to accomplish these results, which are much more efficiently achieved by other means. If the mother guards against the accumulation of excess fat and is careful to see that her abdominal muscles regain their full strength and tone, nothing else is necessary to insure the restoration of her original form. In the past some doctors have believed that a tight binder, by making pressure on the uterus, might help to prevent bleeding after delivery. This, too, is doubtful; at any rate there are far more certain methods of insuring against such trouble.

From the wearing of too tight a binder actual harm may result. It is possible for the large and heavy womb to be pushed backward, so that a condition of displacement develops. If the tight binder is worn steadily for a long time, then the abdominal muscles, being more or less splinted and immobilized, will never recover their proper elasticity and strength.

There is no doubt, however, that for the first day or two after delivery, and again when patients begin to get out of bed, the binder affords most women a considerable amount of comfort. It gives support to the stretched abdominal wall and overcomes the annoying feeling of relaxation and emptiness; it is also a help in the prevention of backache.

For these reasons the writer allows the use of the binder, with certain restrictions. It is to be put on snugly, but must never be really tight. For the first two days it is worn all the time. After that it is left off as long as the mother remains in bed unless she feels definitely more comfortable with it. When she gets up it is again worn steadily for a week or two, and is then gradually abandoned as the natural strength of the abdominal wall returns.

The best binder is a strip of unbleached muslin, long enough to reach around the mother's body with at least ten inches to spare, and of sufficient width to extend from the lower ribs down around the upper parts of the thighs. It opens in front, the ends being fastened from the bottom up with large safety-pins.

When the binder is discarded at the end of the fourth or fifth week, the question of corsets arises. To the light elastic belt there can be no objection. The regular corset, on the other hand, is more than an article of clothing; it is really an orthopaedic appliance. It gives support, which is sometimes an advantage, but it also constricts and partially immobilizes the abdominal wall, and these effects are decidedly disadvantageous. The improper use of tight corsets is one of the reasons why so many women have poor abdominal muscles; any muscle in the body, if splinted for a long period of time, is sure to waste and weaken.

The wearing of corsets is allowable under two conditions. In the first place, when the mother begins to be active her abdominal muscles have as a rule not yet regained their full strength, and a certain amount of support often adds to her comfort and prevents backstrain. A light corset, preferably lacing in the front, may be worn for a part of each day. The patient's aim, however, should be to develop her muscles so that they themselves will afford adequate support to the abdominal organs, without the assistance of apparatus. With this purpose in mind she leads a well ordered hygienic life to keep her whole body in the best possible condition, and may also if necessary continue the special abdominal gymnastics already described. At the end of two or three months there should be no further need of artificial support.

In the second place, there are cases in which the abdominal musculature has become weakened beyond any likelihood of

recovery, usually as a result of the previous improper use of corsets, poor general hygiene, and repeated pregnancies. In such cases corsets are prescribed to afford the support which Nature is no longer able to provide. This makes the best of a bad situation, which would seldom arise if patients were properly cared for at two important periods in their lives—young womanhood, and the time of convalescence from pregnancy.

**The Care of the Perinaeum.** The perinaeum and vulva require more than the ordinary cleanliness which is maintained for the rest of the mother's body. These parts must be kept *surgically clean*, or *aseptic*—that is, they must be carefully protected from contact with anything which might carry germs and from all sources of infection. Such precaution is important for the sake of the perinaeum itself if there are any stitches, and is always doubly important because of the raw condition of the lining of the womb, to which the access of germs from outside would prove a very serious matter.

For the first two weeks at least, and longer if any lochia persist, the patient wears sterile absorbent pads over the vulva. These may be pinned in front and behind to the abdominal binder, or may be retained by a "T-bandage"—a belt of muslin which encircles the waist and is provided with a perinaeal strap sewed to the belt in back, the free end of the strap being pinned in front where the two ends of the belt meet.

The vulvar pads serve two main purposes: they absorb the lochia, and protect the genitals from all contamination. It is needless to say that the parts should never be touched by the patient, and only with the most stringent aseptic precautions by the nurse or doctor. Some physicians prefer to have the pads saturated with antiseptic solution in order to accomplish a third purpose: the killing of the

germs that are always present in the lochial discharge. No deodorizing drugs should be used, as they might conceal an abnormal odor which ought to be detected.

The pads are changed as often as soiled—every two or three hours on the first day, and not less than every six hours thereafter. In addition, a fresh pad is put on each time the patient empties her bladder or moves her bowels. At least one of the soiled pads should be saved daily in order that the doctor may note the character of the lochia.

Whenever a pad is changed the nurse takes the opportunity of washing the vulva and perinaeum with an antiseptic. The patient is placed on a bed-pan, and the solution (which may be bichloride of mercury, one part in two thousand of water) is poured over the genitals from a pitcher. The nurse then sponges the parts with sterile cotton pledges, wiping from above downward without attempting to separate the labia, and applies a clean pad. That surface of the pad which is to be in contact with the vulva and perinaeum must never be touched by the attendant's hands. The care given to the genitals by a skilled nurse is one of the most valuable of the many services which she can render to the maternity patient.

Douches used to be a common item of treatment during the lying-in period. They are now considered to be generally unnecessary and potentially harmful at that time. Accordingly they should never be given unless ordered by the doctor for some definite reason.

**Bathing.** Considering the free elimination of waste by perspiration that occurs during the early days, we see the obvious importance of keeping the mother's skin healthy and clean. As long as the patient stays in bed she should receive a warm soap-and-water sponge-bath each morning and an alcohol rub at night. After the end of the third week ordinary tub-baths may be taken in normal cases.

**Temperature.** Morning and evening for the first two or three weeks the nurse takes the mother's temperature and records it on a chart. Slight rises of a degree or even two are so common in the earliest days as to be considered practically normal. Any marked elevation of temperature, however, demands an immediate search for the cause. In many cases this proves to be nothing more serious than constipation, or perhaps an emotional upset; in others it is some incidental condition like a sore throat or a cold; but occasionally a high temperature is the first sign of an obstetrical complication such as child-bed fever, breast-abscess, or milk-leg, and the earlier these are diagnosed the more successfully can they be treated.

**The Bowels.** Throughout the lying-in period constipation is rather the rule than the exception. The recumbent position, relaxed abdominal walls, lack of exercise, and reduced diet all combine to make natural movements of the bowels more or less difficult. It is a very old custom, and usually a good one, to give a cathartic on the third day. The writer's patients receive an ounce of castor oil on the morning which falls between forty-eight and seventy-two hours after delivery, unless their bowels have already moved spontaneously.

During all the remaining time that the mother spends in bed she will probably require a certain amount of assistance in obtaining regular movements. The following is an excellent scheme of management. Whenever the patient has gone a full twenty-four hours without an action, she is given in the evening one of the milder cathartics, such as senna or cascara. If the bowels do not act by the following morning, she receives a soap-suds enema. In this way an evacuation is assured at least once every forty-eight hours, while at the same time the bowels have a chance to move by themselves and are not encouraged to depend entirely upon artificial stimulation.

When the mother gets up and about and begins to take a fair amount of exercise her bowels ought to regulate themselves without assistance, and the use of drugs and enemas should be discontinued as rapidly as possible. Directions for the treatment of constipation in the nursing mother will be found in Chapter XII.

We have noted that *haemorrhoids* are not uncommon during the latter part of pregnancy. Sometimes these become worse after the baby is born; they may be exceedingly annoying for several weeks. In most of such cases the condition tends to spontaneous cure, but great relief from the temporary discomfort may be obtained by various ointments and suppositories, the use of the ice-bag, and such other measures as the doctor recommends.

#### HEALTHY MOTHERS

A century ago doctors did comparatively little obstetric work. Most births were attended by midwives, often ignorant and dirty old women of the Sairey Gamp type. Medical help at confinements was thought necessary only for abnormalities or emergencies, which were seldom recognized until they had already become alarming. Of proper prenatal care and care after delivery mothers had none, except again in the presence of a complication endangering the health or life of the patient. In fact, there was in some quarters a strong feeling on the impropriety of male doctors, "men midwives," attending women in normal pregnancy and labor.

The intelligent woman of to-day wants to have the most skilful doctor that she can get when her baby is born. Most women now realize the enormous importance of medical supervision throughout pregnancy. There is still, however, a need for popular education about the value of adequate postnatal care.

The best doctors are nowadays paying more and more attention to what they call *end-results*—the final condition of patients some long time after treatment has been completed. The ideal end-result in obstetrics is a normal baby and a perfectly healthy mother. As we said in Chapter I, childbearing is a natural process. That being so, *it ought never to damage a woman*. And yet how frequently one sees a semi-invalid patient who dates all her many troubles from the birth of a baby! To prevent such misfortunes is the particular function of medical supervision in the postnatal period.

This chapter has described the detailed care given to the mother by the doctor and nurse during the first few weeks. Beyond that time results will depend largely upon the mother herself. It is often hard to make people realize that good personal hygiene is not merely a vague ideal, but has a definite effect in the way of preserving health and prolonging life. This is never truer than in the case of the mother when her body has only just recovered from the strain of pregnancy, while her mind and body both are fully occupied with new demands. Then particularly will she benefit from regularity of habit, sufficient rest, well-balanced diet, and healthy exercise; the opposite conditions, on the other hand, are capable of doing lasting harm. It is no easy task to correct the faulty habits of years, but the early days of motherhood, involving as they necessarily do the beginning of much that is new, are an ideal occasion for the development of healthier habits and a better system of bodily care.

The mother should never omit to report to her doctor for a thorough final examination around the end of the second month. The advantages of so doing are numerous. If her heart and other important organs are in perfect condition, and the womb, abdominal wall, and pelvic floor

have undergone the proper changes and are fully restored to their normal non-pregnant state, assurance of those facts is highly satisfactory to both patient and physician. If there are minor disorders, it is most important to discover them while they are still easy to correct and before they assume major proportions. On the occasion of this visit the doctor will discuss with the mother the general plan of life which she proposes to follow in the next few months and will make whatever suggestions are necessary to render that plan most efficient from the viewpoint of health. A question often raised is when the marital relation may be resumed; in most cases it is permissible after the tenth or twelfth week. On this and many other points the expert advice of the physician who has so carefully guarded the patient through pregnancy, labor, and the early lying-in weeks will serve to guide her through the months that are to come and to insure that she remains, in the fullest sense of the term, a healthy mother.

## CHAPTER XII

### NURSING, AND THE CARE OF THE BREASTS

#### THE IMPORTANCE OF BREAST-FEEDING

Mother's milk is the one perfect infant food. It is always ready, and needs no preparing. It is certain to be pure, fresh, and warmed exactly to the right temperature. In composition it is ideally suited to the baby's complex needs.

The milk of cows and other animals can be modified for the use of the young baby, and the skill of modern doctors in managing such artificial feeding is of great value whenever for any reason breast-feeding is found to be impossible. But upon this point all are agreed: there is no method of artificial feeding, however carefully worked out, which is as good for the baby as normal and healthy maternal nursing.

Mother's milk gives the baby more than merely the necessary elements of food. It helps him to resist infection and to fight off disease. No substitute can accomplish this in the same degree. Four-fifths of all infant deaths in the first year are among babies artificially fed.

It is clearly the duty, therefore, of every mother to nurse her baby, unless to do so is actually impossible. And that is very rarely the case. Of mothers receiving proper prenatal care, nineteen out of twenty should be able to feed their babies at the breast. It is perhaps true that the ability to nurse ideally is diminishing among modern highly civilized women, and that supplementary feeding and early weaning often become necessary. Even in such cases, however, a certain amount of maternal nursing is usually

of great advantage to the baby, though other food may have to be added. Occasionally it happens that a sick baby will refuse all artificial food, but take the breast willingly.

A mother who solely for the sake of her own comfort and convenience decides not to nurse is doing her baby a great injustice and imposing a definite handicap upon him in the early months when he particularly needs every help in adjusting himself to his new environment. And she is quite as likely to lose in convenience as to gain, for the proper management of artificial feeding is no small task.

In the first few weeks nursing possesses one special advantage for the mother. The stimulation of the nipples, acting through the nervous system, causes the womb to contract firmly and to undergo the process called involution—a return to the healthy non-pregnant state. With women who do not nurse this process is likely to be delayed or incomplete, and various annoying symptoms are often the result.

In a small number of cases the doctor may decide that it is best not to attempt breast-feeding, and that wet-nursing or carefully planned artificial methods must be used from the beginning. There are two sorts of conditions which render this decision necessary: serious diseases, like tuberculosis, in the mother, and abnormalities of the breasts, such as retracted nipples, which would make nursing practically impossible. Only rarely are such difficulties encountered when the patient has had the benefit of good care during her pregnancy.

#### THE MANAGEMENT OF NORMAL NURSING

During the first two or three days the breasts contain colostrum, but no milk. Nevertheless it is desirable for the baby to nurse from the beginning, even though what he obtains at first is not true food. Nursing empties the

breasts and accelerates the secretion of milk, while the colostrum helps to regulate the baby's bowels. In addition the irritation of the nipples, as above stated, has a valuable influence on the mother's uterus, stimulating it to normal contraction.

The baby should be put to the breast first about twelve hours after birth, and then every six hours for the two or three days until the milk comes. Each nursing lasts ten minutes. It is best to use the breasts alternately, one each time.

No other food is needed by the baby during these early days. He will lose some weight, perhaps six or eight ounces, but that loss is normal and does no harm. Extra water, however, is very important, and should be given frequently. The new-born baby's need of water is much greater than that of the adult. He may have any amount that he will take up to one ounce (two tablespoonfuls), five or six times at intervals throughout the day. The water must be sterilized by boiling, and should be at body temperature when it is given. It makes no great difference whether the baby takes this water from a nursing bottle with a rubber nipple, or from a spoon; in any case, however, all utensils must be boiled each time before being used.

The "coming-in" of the milk occurs usually some time during the third day. The breasts fill up, often with great rapidity, and are likely at first to be painful and tender; they become large and heavy, and are said to feel "like two hot weights." Sometimes the enlargement extends well up toward the arm-pits. Though there is an excess of milk at the start, in most cases a balance is struck between what the baby takes and what the breasts produce, so that the initial discomfort soon disappears.

Some slight headache or general lassitude is often experienced when the milk first comes. There is, however,

no rise of temperature from this cause. The so-called milk-fever about which much used to be heard has usually nothing to do with the breasts, but is the result of trouble elsewhere, which should be promptly investigated and treated.

Now begins the period of real nursing, and a proper beginning will do much to insure success and ease in feeding the baby for some months to come. Not uncommonly there are minor difficulties at the outset, but once these are overcome all goes smoothly. Well begun is half done.

**The Daily Program.** Perhaps the most important thing that the young mother can do to make the nursing of her baby easy and successful is to establish a regular and systematic daily schedule. It is surprising how readily habits, good or bad, can be developed in a baby, even during the first few weeks, and upon the wisdom with which these habits are formed will depend to a large extent the convenience and comfort of the mother and the welfare of the baby himself.

The arrangement of the schedule for each baby, particularly with regard to the number of feedings, is a matter on which the doctor's advice is necessary. A program frequently used during the first three months provides for seven feedings per day, coming at 6, 9, 12, 3, 6, 10, and 2 o'clock; later there will be fewer feedings at longer intervals. The nursing at 9 in the morning conveniently follows the baby's daily bath. It is often possible to omit the night feeding (at 2 a.m.), and if the baby can be so trained from the start, the unbroken night's rest is of great advantage to the mother.

The nursing program having been planned, it should be followed conscientiously. The baby must be awakened, if necessary, at the times of feeding. There must be no extra nursings between the scheduled hours, although water may

be given. Only in this way will proper habits be learned. To nurse a child every time it cries is the surest possible method of disorganizing not only the child itself, but the entire household.

**The Details of a Feeding.** The young mother may find it helpful if we set down in systematic order the steps of a properly conducted breast-feeding. With practice and experience these details become almost automatic, but at first the new responsibilities and the number of things to be done often seem overwhelming. It is necessary to do only one thing at a time, but important to do that right.

(1) The first step is to change the baby's diaper, so that when the feeding is over he can be laid down at once and allowed to go to sleep without further disturbance.

(2) The mother (or nurse, or whoever is to handle the breast) must then wash her hands thoroughly with soap and warm water.

(3) The breast-binder is opened, and the dressing is removed from the nipple of the breast which is to be used. The nipple is then cleaned and sterilized with a solution of boric acid. (The solution is made by dissolving a level teaspoonful of boric acid crystals in a cupful of boiling water. It should be kept in a covered glass jar.) For applying this to the breast one may use sterilized cotton or a small square of sterilized gauze.

(4) Some doctors advise that the baby's mouth be gently wiped out with a bit of gauze moistened in the same solution of boric acid. The writer does not regard this as necessary. If it is done, great care must be taken not to bruise or scratch the delicate lining of the mouth.

(5) The mother may nurse either in the lying or in the sitting posture. The former is necessary, of course, at first, and is preferred by many mothers at all times because of greater ease and relaxation. The baby is supported by

the arm on the same side as the breast that is being used. With the thumb and fingers of the other hand the breast is held in such a way that the baby can readily seize the nipple, while the bulkier part of the breast does not rest upon his face (Fig. 19). He should be able to take the whole nipple and part of the areola into his mouth.

(6) The length of a feeding is, on the average, fifteen minutes; it should seldom be less than ten or more than twenty. The doctor had better be consulted on this point, since both the needs of the baby and the amount of milk in the breasts must be taken into consideration. In no case should the child be allowed to sleep at the breast; either he must be awakened and induced to continue nursing, or the feeding must be stopped.

(7) When the feeding is finished the mother holds the baby upright for a moment, pressing his abdomen against her chest and gently patting him on the back. This helps him to bring up any air which he may have swallowed in the act of sucking.

(8) The baby is then put into his crib and left alone. Under normal conditions he will nearly always go happily to sleep.

(9) The nipple is again washed with sterile gauze or cotton moistened in boric acid, and is wiped dry. A clean bit of gauze is laid over it, and the tapes and binder are adjusted as will be described presently.

**Extra water** is, in general, good for the nursing baby, especially in hot weather. In fact, one reason why normal babies cry is because they are thirsty. Water should be offered three or four times a day, always between feedings so as not to take the place of milk. An ounce (two table-spoonfuls) at a time may be given during the first three months, but the baby is usually the best judge of how much he needs, and should not be urged to take more than he



FIG. 19. A COMFORTABLE AND SATISFACTORY POSITION FOR NURSING



appears to want. The water must be first boiled and then brought to body temperature, just as was done in the earliest days, and the spoon or bottle and nipple from which it is given must always be sterilized by boiling.

The supplementary bottle, replacing one breast-feeding by a modified formula of cow's milk, may be introduced, if the doctor considers it wise, after the first month. This plan has the advantage that once during the day the mother is allowed a six-hour interval of freedom, with resulting benefit both to herself and, indirectly, to the baby. There will be less difficulty, too, when the time of weaning comes if the baby has been accustomed to the use of the bottle from his early weeks.

The signs of successful nursing are obvious enough, even to the most inexperienced. The baby takes his food readily, and appears satisfied when he has finished. He does not "spit up" excessively, or vomit. His bowel-movements consist of one, two, or three soft yellow stools in each twenty-four hours. He sleeps well, and is generally good-humored when awake. Most important of all, his weight increases steadily after the first few days, at the rate of five ounces or more per week. When everything is going as just described, there need be no concern about the successful character of the nursing.

#### CERTAIN DIFFICULTIES IN BREAST-FEEDING

**Sore nipples** are common in the early weeks of nursing, especially when the baby is the first one. The constant moisture and the irritation of sucking make the delicate skin of the nipples very tender, and may even produce little cracks or fissures. As a result the act of nursing becomes exceedingly painful. There is also some risk of infection getting in through the fissures and causing trouble in the deeper parts of the breast.

Much can be done to prevent sore nipples by proper care during the last few weeks of pregnancy, as described in Chapter VII. When the condition develops, the first essential of treatment is to give the nipple a short period of rest. If one nipple only is affected, nursing may be limited to the other breast for a day or so. When both are sore, or a longer rest is required, the best plan is to use a standard glass nipple-shield, obtainable at any drug-store (Fig. 20).



FIG. 20. A GOOD TYPE OF NIPPLE-SHIELD, MADE OF GLASS AND RUBBER

This appliance prevents the child's mouth from coming in direct contact with the mother's breast. There is ordinarily no difficulty in inducing the baby to nurse through a shield. It is important, however, that the hole in the rubber nipple of the shield be large enough to allow a free flow of milk; if such is not the case, it can easily be enlarged by passing a red-hot hairpin through it. The nipple-shield must be boiled each time before use.

Sometimes it is advantageous to protect the sore nipple between nursings with a small lead shield, which prevents pressure and the constant contact of moist or sticky dressings.

In addition to rest, there are certain local applications which help the sore or cracked nipple to heal. Most useful among them is the compound tincture of benzoin; this is painted over the nipple after each nursing with a clean camel's-hair brush, and is allowed to dry on. What remains of it is washed off when the nipple is sterilized with boric acid before the next feeding.

**Caked Breasts.** In the early days of nursing it not uncommonly happens that lumps or "cakes" appear in the breasts. They are due partly to congestion, and partly to engorgement of one or more lobes of the breast with an excess of milk.

The use of the breast-pump is not recommended for this condition, nor is massage, except possibly in expert hands. The best method of treatment is to do nothing except to put on a firm binder. There is no objection to the application of heat by means of cloths wrung out of hot water, or of cold in the form of the ice-bag, if either is grateful to the patient.

**Reluctance of the baby to nurse** is occasionally troublesome at the start. If the cause is weakness on his part or inability to suck, it may be necessary to draw the milk with a breast-pump and feed it to him with a medicine-dropper. In the majority of cases, however, the treatment is simply education, in which at times a good deal of perseverance is required. Partially withdrawing the nipple as the baby takes it often stimulates him to seize it more eagerly. Sometimes a little milk smeared on the nipple induces him to start nursing, and after that all goes well. By such devices a clever and patient nurse will be able to overcome this difficulty, which in most cases is temporary only.

Variations in the milk may affect its quantity, its quality, or both. As a general thing the quality is likely to be good. The quantity varies considerably among different women; it bears little relation to the size of the breasts.

*If the quantity is excessive* and the flow is very free, the baby will probably take his food too fast, and will "spit up" or regurgitate milk and raise air after each feeding.

In such cases the mother should lessen the amount of fluid in her diet, and wear a fairly firm breast-binder. Care must be taken to see that the baby does not feed too rapidly or get too much. The intervals between feedings may be lengthened.

*Too little milk* leaves the baby unsatisfied after each nursing, and causes him to be hungry before the time of the next. He is likely to be constipated. His weight remains stationary, or shows only a slight increase.

The one sure way of deciding whether he is getting a sufficient quantity of food is to weigh him before and after each feeding. The difference, of course, represents the weight of milk that he has taken. During the first month an average feeding ought to give him two ounces or more; the amount should be three to five ounces during the second and third months, and five to seven ounces from the fourth month to the eighth. Single feedings will be found to vary in amount, but a sufficient total quantity for each twenty-four hours is the really important consideration.

When the breast-milk is deficient in quantity, the most careful attention should first be given to the mother's hygiene and general manner of life, particularly to diet and out-door exercise. It is also important to see that the breasts are completely emptied at each nursing, by the use of the breast-pump if need be, or by a special sort of massage, as thus they can often be stimulated to greater activity. Frequently it becomes necessary, however, to supplement with arti-

ficial feedings, under the doctor's direction. The wisest plan in such cases is to give a little extra food after each maternal nursing, rather than to alternate feedings from the breast with those from the bottle.

*Milk that is too rich* upsets the baby's digestion. Common symptoms are vomiting, wind, and colic. Diarrhoea and green stools show the disordered state of the bowels. The weight stands still, or may even decrease.

The mother should reduce her diet somewhat, particularly with regard to meat, cereals, and milky foods. She should also drink more water, and increase her daily amount of exercise. It may be wise to lengthen the intervals between nursings. About a tablespoonful of boiled water given immediately after each feeding will often dilute the milk to the proper strength.

*Poor quality of the milk* is fortunately not a very common trouble. In such a case the baby nurses eagerly, but may appear unsatisfied when he has finished, and is sure to be hungry before the time of his next feeding. His weight does not increase at the proper rate.

An analysis of the milk will show whether or not it is faulty in quality. The treatment is to improve the mother's diet and general hygiene. If the milk remains poor, it may be better to rely largely on artificial feeding, though nursing should not be stopped altogether.

**Digestive disorders in the baby**, whether due to the mother's milk or not, are too serious in their possibilities to be treated except with medical advice and supervision. This book does not attempt to discuss the subject of feeding beyond the general principles that apply to the normal baby in his early weeks. More extended information about infant feeding will be found in the several excellent books on that special subject. In all cases, however, vomiting, constipation, diarrhoea, green stools, colic, and the failure

to gain in weight are symptoms for which the doctor should be consulted.

#### THE NURSING MOTHER'S CARE OF HERSELF

**Daily Habits.** Nursing is a business, and to conduct it properly requires no small amount of time and care. If it is to be well managed, it must in fact be the mother's main business in life during the baby's early months. Social engagements and other outside activities cannot be allowed to interfere. The success with which nursing is carried out will depend very largely on the mother's willingness to make the care of herself, as well as of the baby, her first and most important concern. The results are in her hands.

The mother's daily life must be arranged along orderly and systematic lines. Those items of everyday hygiene which are important enough at all times become doubly so during the period of nursing. Irregular hours, fatigue, worry, and faulty diet on the mother's part are any or all of them likely to interfere directly with the well-being of the baby.

Each day's program must include a definite place for three things—rest, recreation, and exercise. These are not to be taken casually, but should be no less regular than the meals.

As regards *rest*, the mother ought to plan for nine hours each night, retiring at ten and getting up at seven after the early morning feeding. Her sleep is always subject to some interruption, so that shorter hours of rest at night will not be sufficient. In addition, it is usually advantageous if she can arrange to lie down and be entirely undisturbed for half-an-hour or so every afternoon.

*Recreation* is essential, because no one can maintain one's best efficiency without a certain amount of variety in the daily program and an occasional period of freedom from

duty. Once each day the young mother should aim to get away for a little while from her house and her baby and enjoy some diversion or entertainment, even though it is nothing more than a drive or a chat with friends.

*Exercise in the open air* is a particularly important part of the daily routine. Walking affords an excellent form of exercise, but any sort to which the mother's tastes incline is satisfactory, provided it is not fatiguing. House-work cannot be regarded as exercise in the proper sense, since it does not combine diversion or fresh air with the use of the muscles. The beneficial effect of moderate healthy exercise on the milk is often very apparent. Many mothers are not able to feed their babies adequately until they themselves get out and around.

The mother's state of mind has a very marked influence on the success of nursing. Women who are naturally calm and placid are nearly always better able to feed their babies than those who are nervous, emotional, or unhappy. A single experience of grief or anger may so alter the milk that the baby is upset for days. The old belief that the child inherits the temper of its mother is probably founded on the disturbances manifested by the baby when the nursing mother is passing through a period of mental or emotional strain.

Obviously, then, the mother must try to keep herself cheerful, calm, and happy. It is easy to give this advice, and not always so easy, even for people of strong character, to follow it, especially at a time when new and perplexing problems are constantly arising. This much is sure: each moral victory makes others definitely easier, and the habit of equanimity, when cultivated, grows steadily with practice.

The diet of the nursing mother is not essentially different from any ordinary well arranged and balanced diet. All food makes milk, and as long as the mother is properly

nourished her milk is sure to receive the right proportion of each food-element, provided the breasts are normal. Any food which agrees with the mother is very unlikely to upset the baby, but articles that derange her digestion may cause alterations in the milk which in turn affect the child. Comparatively few foods taken by the nursing mother appear directly in her milk; small traces of certain vegetables, such as onion and turnip, may be found, but even they do the baby no harm so long as the mother's digestion is not disturbed.

The following are the rules for diet which the writer gives to nursing mothers:

(1) Eat three good meals a day, at regular times.

(2) Your food should be plain and wholesome. Whatever agrees with you is all right. There is special value in fresh or cooked fruits of any sort, green vegetables, cereals, and milky things like cocoa, chocolate, custards, and ice-cream.

(3) Drink three quarts (twelve glasses) of fluid between meals each day, preferably four glasses of milk and eight of water.

(4) Avoid articles known to be indigestible, such as fried food, hot bread, or highly seasoned dishes.

Constipation, a very common fault of hygiene among women, is to be carefully avoided by the mother who is nursing. It is often an obstinate complaint, but *it can nearly always be cured*, if the patient is willing to take sufficient time and trouble for its correction. The remedy is not medicine, which in the long run tends only to make a bad matter worse. Nor can a real cure be expected overnight by any system of treatment. Like most other desirable things, relief from this trouble is gained only by steady and conscientious effort.

The régime advised in the treatment of ordinary constipa-

tion includes five items: reeducation of the bowel, proper diet, abundant fluid-intake, exercise, and abdominal massage.

(1) *Reeducation of the bowel* is the most important detail of treatment. In the majority of cases the main cause of the trouble is simply faulty habit, and the habits of the bowel can be improved by training just as successfully as the habits of the individual. To this end the patient must select a time when she will each day have twenty minutes free from all other demands. She must be prepared to sit on the closet for the full twenty minutes, unless a movement is obtained sooner. Her thoughts are to be kept upon the aim in view, and not to be diverted by reading. Violent efforts of straining are not advisable. If the bowels do not move at this time, they should not be allowed to move, except for urgent necessity, until the same time on the following day. Each success accomplished at the regular time makes a repetition of that accomplishment definitely easier, and leads in the course of weeks to the establishment of a permanent habit.

(2) The standard *diet* outlined for the nursing mother is well suited to the treatment of constipation. Fresh fruits and leafy vegetables should be given a prominent place. Bran forms a useful addition to the diet, either as a cereal with cream and sugar, or in the form of biscuits or bread.

(3) *An abundance of fluid* is necessary to make the bowel movements properly soft. The constipated patient ought to take the equivalent of sixteen glassfuls daily, most of it between meals and before the evening. Of course no one ordinarily desires as much to drink as this, and so it must be taken like medicine, which in fact it is, according to a schedule of doses. At least ten of the sixteen glassfuls should be plain water.

(4) A moderate amount of *exercise* is important, since lazy organs are only to be expected in a lazy body. In

addition to general exercise, special abdominal gymnastics of the sort described in Chapter XI will be found helpful.

(5) *Abdominal massage* is of great value in stimulating the sluggish bowel. So-called cannon-ball massage can be given by the patient herself, by means of a twelve-pound shot

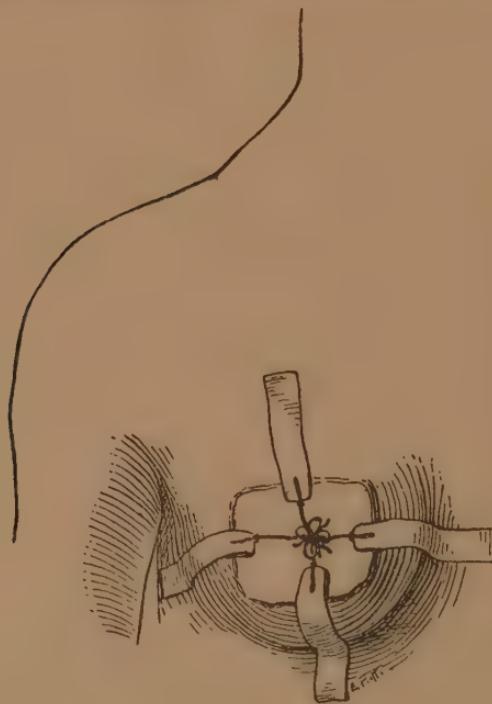


FIG. 21. NIPPLE-DRESSING, RETAINED BY TAPES AND ADHESIVE STRIPS

such as is used in track athletics. The patient lies on her back with her knees drawn up, so as to relax the abdominal muscles. The shot is rolled slowly around the abdomen, following the general direction of the large intestine—up the right side, from right to left over the upper part of the

abdomen, down the left side, and from left to right across the lower abdomen to the starting-point. This massage is continued for five minutes at a time, and is given two or three times a day. It is, of course, not allowable in pregnancy.

Drugs play a very small part in the rational treatment of constipation. For occasional use, perhaps the best are senna, cascara, and mineral oil. Salts must be avoided during lactation because they withdraw fluid from the body and so may tend to dry up the breasts. Many of the cathartics and some other drugs can appear in the milk of the nursing mother and affect the baby, particularly if they are repeatedly and habitually taken. For this as well as other reasons the constant use of purgatives is to be discouraged. The enema habit is no less objectionable.

**The routine care of the breasts** involves two things—the most scrupulous cleanliness of the nipples, and a certain amount of support for the breasts themselves if they are heavy and uncomfortable.

*The cleanliness of the nipples* is assured between nursings by keeping them covered with small squares of sterile gauze, which may be held in place by adhesive plaster and tapes, as shown in Fig. 21. Bits of sterile old linen are quite as satisfactory as gauze, and sometimes more comfortable. After the first month or two the tapes and adhesive straps may be discarded, and the dressing retained in place by the binder or brassière. The attention which the nipples receive at each time of nursing has already been described.

*To support the breasts* there are a variety of binders, slings, and brassières; most of these adequately serve their purpose, which is to lift the breasts and to transfer the weight of them from the chest to the shoulders. Only for some special reason do we use a tight binder; in most cases all pressure on the breasts and particularly on the nipples should be avoided.

During the early weeks of nursing a satisfactory binder is an ordinary towel, pinned around the chest and held up by shoulder straps, as illustrated in Fig. 22. Later it is more convenient to use a light brassière opening at the front, of the sort sold especially for nursing mothers.

### WEANING

The time of weaning under normal conditions comes during the baby's ninth or tenth month. There is seldom any advantage in prolonging the breast-feeding beyond this time, even though all appears to be going well. Occasionally it is wise to nurse an extra month or two in order to avoid weaning during very hot weather, or under other conditions that are trying for the baby. In general, however, nursing after the tenth month is unsatisfactory, if not actually detrimental to both mother and child.

There are certain circumstances which may at any time arise and make weaning necessary. Serious illnesses in the mother, such as an acute infection or a grave chronic disease, and definite disorders of the breasts, like abscess, usually mean that nursing must be stopped. It is generally inadvisable for a woman to continue to nurse if she becomes pregnant again, since in most of such cases the quality of her milk suffers, and a double strain upon her strength is likely to be too great.

An insufficient quantity of milk which is of good quality does not, as a rule, justify weaning. There are real advantages to the baby in even partial breast-feeding, and it is easy to make up the lack in amount by supplementary artificial means. Nor is weaning ordinarily necessary because of short illnesses in the mother. Even though nursing may have to be interrupted on this account for two or three days, it can usually be resumed without difficulty. In rather more than one-half of cases menstruation returns

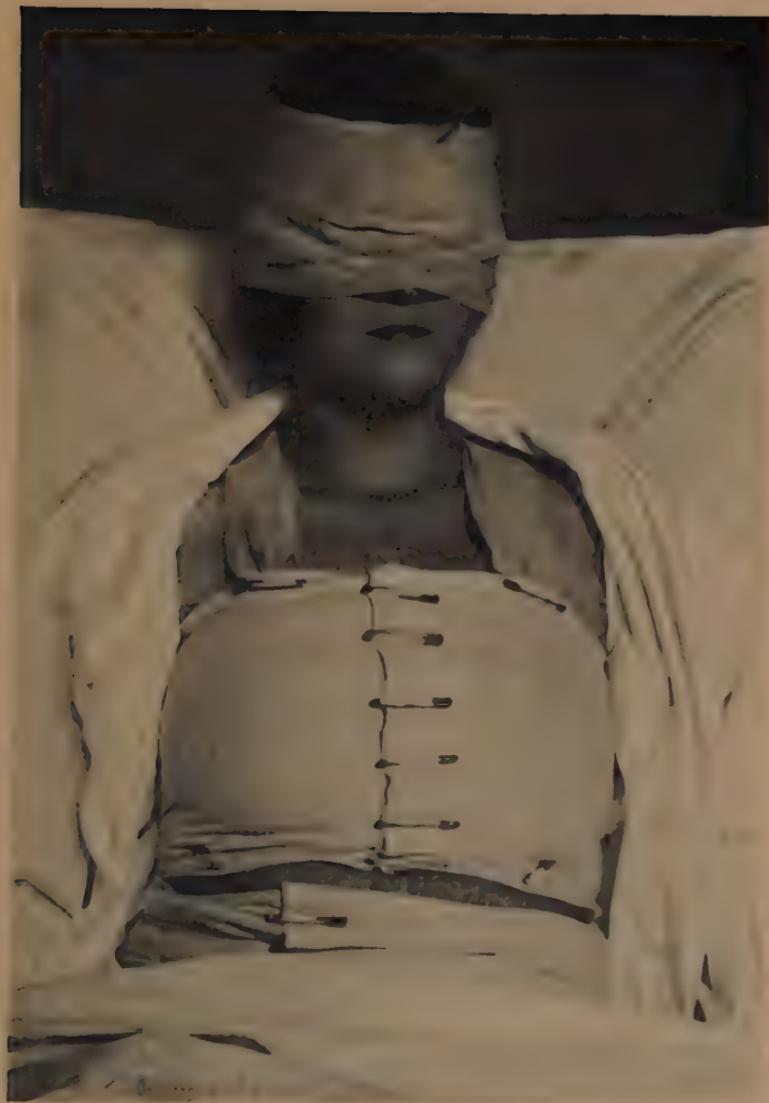


FIG. 22. BREAST-BINDER: A TOWEL WITH DARTS PINNED IN BELOW THE BREASTS AND SHOULDER-STRAPS ATTACHED



while the mother is still nursing, but this has no ill effect on the milk and does not interfere with the continuance of successful breast-feeding.

The best method of weaning is a gradual transition from maternal nursing to artificial feeding. If the baby has from his early weeks been accustomed to a supplementary bottle, it is easy to increase the number of bottles and decrease the number of breast-feedings until by the end of a week or ten days the breast has been abandoned altogether. Such a method is advantageous to the baby, avoiding too abrupt a change in the duties required of his digestive organs, and is also most comfortable from the mother's viewpoint.

It sometimes happens for one reason or another that complete weaning suddenly becomes necessary, though this should be avoided as far as possible, because it is attended with certain risks. There may be some little trouble at first in inducing the baby to take the bottle, since babies are creatures of habit, and are very quick to notice any change in the quality of their food, but perseverance and training will soon overcome the difficulty. The all-important thing is to be certain that the substituted food is properly suited to the baby's needs, and this is assured only when the change is made under the direction of the doctor.

**Drying up the breasts** used to be an elaborate, tedious, and oftentimes painful process. Now we know that the old methods of pumping, massaging, plastering, and rubbing merely served to delay the desired result. The best way to treat the breasts is to apply a firm binder, and except for this to leave them entirely alone. There is no medicine which can be relied upon to dry them up, although the saline cathartics sometimes diminish the milk-secretion by withdrawing fluid from the system through the bowels. It is wise for the mother to restrict the amount of her fluid-intake for a week or so.

Under this treatment the breasts at first become very full, and are often uncomfortable. After two or three days, however, the engorgement subsides, and from that time on there is no trouble. No longer is any great quantity of milk secreted, although a small amount may be found in the breasts for several weeks.









## INDEX

Abdomen, enlargement in pregnancy of, 42

Abdominal binder after delivery, 170  
binder in pregnancy, 82  
exercises, 165  
massage, 194

Abortion, 23

Afterbirth, 29  
delivery of, 114

After-pains, 158

Airing baby, 146

Amnion, 24, 28

Amniotic fluid, 24, 28

Anaesthesia in labor, 126

Appetite in pregnancy, 35, 39, 73

Areola, 17  
changes in pregnancy in, 33

Artificial feeding, 179, 188  
respiration, 121

Asepsis during delivery, 117, 119  
in lying-in period, 173

Automobile, use during pregnancy of, 78

Baby-carriage, 151

Baby-clothing, preparation of, 106

Bag of waters, 23, 28  
of waters in labor, 111, 112

Ballottement, 46

Bathing baby, 134  
during lying-in period, 174  
in pregnancy, 84

Bearing down, 113, 118

Bed for confinement, 102  
length of time after delivery in, 161  
preparation for labor of, 115

Binder, abdominal, after delivery, 170  
abdominal, in pregnancy, 82  
breast, 195

Birth, management without doctor of, 124  
premature, 23

Bladder, irritability in pregnancy of, 36, 40

Bleeding after delivery, 124, 155  
during labor, 111, 123  
during pregnancy, 32, 38

Blood-pressure in pregnancy, 88

Bottle, supplementary, 185

Bowels—*see Constipation*

Brassière—*see also Breast binder*  
in pregnancy, 82

Breast binder, 195  
feeding, difficulties in, 185  
feeding, importance of, 179  
milk, variations in, 188

Breasts, 17  
caked, 187  
care during lactation of, 195  
care in pregnancy of, 96  
changes in pregnancy in, 17, 33, 39  
drying up of, 197

Breathing, establishment of baby's, 119

Breech births, 128

Caesarean section, 129  
 Caked breasts, 187  
 Calculating date of confinement, 49  
 Calories, 70  
 Carbohydrates in diet, 68  
 Care of baby at birth, 119, 131  
     of mother immediately after delivery, 154  
     of nursing mother, 190  
     of young baby, 134  
 Cathartics during lactation, 195  
     in pregnancy, 92  
 Caul, 112  
 Cell-division, 22  
 Cells, 18  
 Cervix, 13  
     dilatation in labor of, 110  
 Cessation of menstruation, 31  
 Changes in mother's body after childbirth, 157  
     in womb in pregnancy, 29, 38, 45, 51, 109  
 Chorion, 24, 28  
 Chromatin, 19, 21, 57  
 Clothing for baby, preparation of, 106  
     in pregnancy, 80  
 Color of eyes, inheritance of, 60  
 Colostrum, 34, 180  
 Coming-in of milk, 181  
 Conception—*see also Fertilization of ovum*  
     during nursing, 34, 160, 196  
 Confinement at home, preparations for, 100  
     at home, supplies for, 102  
     date of, 48  
     in hospital, preparations for, 105  
 Congenital diseases, 62  
 Constipation during lying-in period, 175  
     in nursing mother, 192  
     in pregnancy, 39, 92  
 Cord, umbilical, 24, 27, 64  
     umbilical, care of stump of, 131  
     umbilical, treatment at birth of, 121  
 Corpus luteum, 10, 12  
 Corset after childbirth, 172  
     in pregnancy, 81  
 Cramps in legs in pregnancy, 94  
 Cravings, 73  
 Crib, 151  
 Crying, baby's, 148  
 Date of confinement, 48  
 Diapers, 143, 145  
 Diet, 67  
     effect on unborn child of mother's, 73  
     in lying-in period, 164  
     in pregnancy, 71  
     of nursing mother, 191  
 Difficulties in breast-feeding, 185  
 Digestive disorders in baby, 189  
 Dilatation of cervix in labor, 110  
 Disease, inheritance of, 61  
 Displacements of womb, 14  
 Douches during lying-in period, 174  
     in pregnancy, 95  
 Dressing baby, 140  
 Dropping—*see Lightening*  
 Drying up breasts, 197  
 Ductless glands—*see Glands of internal secretion*  
 Egg—*see Ovum*  
 Embryo, 22  
     development of, 22

Endocrine glands—*see Glands of internal secretion*  
Enemas during lying-in period, 175  
in pregnancy, 92  
Environment, 57  
Establishment of baby's respiration, 119  
Eugenics, 4, 61  
Examinations during labor, 117  
during pregnancy, 37  
Exercise for nursing mother, 191  
in pregnancy, 75  
of baby, 145  
Exercises, abdominal, 165  
External os, 14  
Extrauterine pregnancy, 22  
Eyes, care of baby's, 132  
inheritance of color of, 60  
treatment at birth of baby's, 122  
Fallopian tubes, 12  
False pains, 56, 114  
Fatigue in pregnancy, 76, 80  
Fats in diet, 68  
Feeding, details of, 183  
Feedings, schedule of, 182  
Fertilization of ovum, 21, 53  
Fetus, 25  
Fever during lying-in period, 175  
Flatulence in pregnancy, 91  
Fluid, amniotic, 24, 28  
Follicle of ovum, 10  
Fontanelles, 133  
Foods, composition of, 67  
Forceps, obstetrical, 127  
Fresh air, 78  
Fundus of uterus, 13  
Garters in pregnancy, 83  
Gas in stomach and bowels in pregnancy, 91  
Getting up after childbirth, 163  
Glands of internal secretion, 11, 70  
Glandular tissue in breasts, 17  
Gymnastics in pregnancy, 77  
Haemorrhage—*see Bleeding*  
Haemorrhoids after childbirth, 176  
in pregnancy, 43, 92  
Head, baby's, 132  
Heartburn in pregnancy, 91  
Heredity, 21, 56  
Hospital, confinement in, 99  
House-work in pregnancy, 77  
Hygiene, 66  
Immediate care of baby at birth, 119, 131  
Impressions, maternal, 63  
Indigestion during pregnancy, 39, 91  
in baby, 189  
Inherent traits, 58  
Inheritance of disease, 61  
of mental traits, 61  
of physical traits, 59  
Insomnia in pregnancy, 79  
Instruments, 127  
Intercourse after confinement, 178  
during pregnancy, 87  
Internal os, 14  
secretion, glands of, 11, 70  
secretion of corpus luteum, 12  
secretion of ovaries, 12

Involution, 158  
 Itching in pregnancy, 44, 95  
 Jaundice of new-born, 133  
 Kidney trouble in pregnancy, 88  
 Labia, 17  
 Labor at home, arrangements for, 115  
     course of, 109  
     duration of, 110  
     first stage of, 110, 116  
     management of, 114  
     pains of, 111, 113, 114  
     second stage of, 113, 117  
     third stage of, 113, 123  
 Lacerations, 127  
 Lanugo, 25  
 Laundry of baby, 144  
 Layette, preparation of, 106  
 Leucorrhœa in pregnancy, 44, 95  
 Lifting baby, 138  
 Lightening, 43  
 Lochia, 159  
 Lying-in mother, care in first six weeks of, 157  
     mother, immediate care of, 154  
 Management of birth without doctor, 124  
 Marital relation after confinement, 178  
     relation during pregnancy, 87  
 Mask of pregnancy, 44  
 Massage, abdominal, 194  
     of uterus, 156  
 Maternal impressions, 63  
 Maternity garments, 80  
 Meconium, 147  
 Menstruation, 15  
     cessation in pregnancy of, 31  
     disorders of, 16  
     return after childbirth of, 159  
 Mental hygiene in pregnancy, 85  
     state of nursing mother, 191  
     symptoms in pregnancy, 45  
     traits, inheritance of, 61  
 Metabolism, 70  
 Milk, coming-in of, 181  
     fever, 182  
     variations in breast, 188  
 Mineral salts in diet, 68  
 Miscarriage, 23  
 Morning sickness, 35, 89  
 Motoring during pregnancy, 78  
 Moulding of baby's head, 132  
 Nausea in pregnancy, 35, 89  
 Navel in pregnancy, 42  
 Nervous symptoms in pregnancy, 45  
 Nipples, 17  
     care in pregnancy of, 96  
     dressing for, 195  
     shield for, 186  
     sore, 185  
 Nucleus, 18, 57  
 Nurse, engagement of, 100  
     preliminary visits of, 101  
 Nursery, arrangements of, 149  
     equipment of, 107, 149  
 Nursing, daily program of, 182  
     management of, 180  
     mother, care of, 190  
     mother, daily habits of, 190  
 Posture for, 183  
     pregnancy during, 34, 196  
     signs of successful, 185  
     supplies for, 108

Obstetrics, meaning of, 117  
Ovaries, 8  
Ovulation, 9  
Ovum, 19  
    development of fertilized, 21  
    fertilization of, 21, 53

Pads, vulvar, use after delivery of, 173

Pains, false, 46, 114  
    of labor, 111, 113, 114

Palpitation in pregnancy, 95

Pelvic floor, 8

Pelvis, 6

Perinaeum, 8  
    care after delivery, of, 173

Perspiration—*see also Sweat-glands*  
    during lying-in period, 160

Physical acts of mother, effect on unborn child of, 64  
    traits, inheritance of, 59

Pigmentation of skin in pregnancy, 44, 85

Piles—*see Haemorrhoids*

Placenta—*see also Afterbirth*  
    anatomy of, 24, 28  
    birth of, 114

Position of baby in womb, 27

Postnatal care, 176

Posture, alteration in pregnancy of, 42  
    for nursing, 183

Predetermination of sex, 52

Prediction of sex, 53

Pregnancy, bleeding during, 32, 38  
    duration of, 48  
    early signs of, 37  
    early symptoms of, 31  
    later signs of, 45

Pregnancy, later symptoms of, 38  
    positive signs of, 30, 46  
    tubal and extrauterine, 22

Preliminary visits of nurse, 101

Premature baby, 25  
    birth, 23

Prenatal care, 4

Preparations for confinement at home, 100  
    for confinement in hospital, 105

Pressure symptoms during labor, 112  
    symptoms in pregnancy, 43

Proteins in diet, 67, 71

Protoplasm, 18

Quickening, 40

Rashes in pregnancy, 44

Reeducation of bowel, 193

Reluctance of baby to nurse, 187

Rest after delivery, 155  
    for nursing mother, 190  
    in pregnancy, 79

Return of menstruation after childbirth, 159

Room, lying-in, 163  
    preparation for confinement of, 101

Rules for expectant mother, 97

Scales for weighing baby, 140

Settling—*see Lightening*

Sex-cell—*see Ovum and Sperma tozoön*

Sex, predetermination of, 52  
    prediction of, 53

Shoes in pregnancy, 83

Shortness of breath, 43, 95

Show, 111

Signs, 31  
     of pregnancy, early, 37  
     of pregnancy, later, 45  
     of pregnancy, positive, 30, 46  
     of successful nursing, 185  
 Skin, care in pregnancy of, 83  
     changes in pregnancy in, 44  
 Sleep, baby's, 147  
     in pregnancy, 79  
 Sore nipples, 185  
 Spermatozoön, 19  
 Sterilization of supplies, 104  
 Stitches, 127  
 Stomach disturbances in pregnancy, 35, 39, 89, 91  
 Stools of baby, 147  
 Striae in skin of abdomen, 42, 85  
     in skin of breasts, 39  
 Supplementary bottle, 185  
 Supplies for confinement at home, 102  
     for nursing and for baby's toilet, 108  
 Sweat-glands, 84  
 Swelling of feet and ankles, 43, 93  
 Symptoms, 31  
     of pregnancy, early, 31  
     of pregnancy, later, 38  
     to be reported to doctor, 98  
 Teeth in pregnancy, 40, 74  
 Temperature of lying-in mother, 175  
 Thyroid, enlargement in pregnancy of, 47  
 Toilet articles for baby, 108  
 Traits, inherent, 38  
 Travelling during pregnancy, 77  
 Tubal pregnancy, 22  
 Tubes, Fallopian, 12  
 Turning, 129  
 Twilight sleep, 126  
 Twins, 54  
     double-ovum, 55  
     identical or single-ovum, 55  
 Umbilical cord, 24, 27, 64  
     cord, care of stump of, 131  
     cord, treatment at birth of, 121  
 Urinary symptoms in pregnancy, 36, 40  
 Urination after delivery, 157  
     baby's, 148  
 Urine, examination in pregnancy of, 88  
     secretion after childbirth of, 161  
     twenty-four hour quantity of, 89  
 Uterus—*see Womb*  
 Vagina, 16  
 Variations in breast-milk, 188  
 Varicose veins, 43, 93  
 Vernix caseosa, 25, 134  
 Version, 129  
 Villi of chorion, 24, 29  
 Visits to doctor in pregnancy, 2, 88  
 Visit to doctor after confinement, 177  
 Vitamines, 69  
 Vomiting in pregnancy, 35, 89  
 Vulva, 17  
 Vulvar pads, use after delivery of, 173  
 Warmth for new-born baby, 123  
 Water, extra, for baby, 181, 184  
     in diet, 69, 82  
 Waters, bag of, 23, 28

Waters, bag of, in labor, 111, 112  
Weaning, 196  
Weight in pregnancy, 39  
  of baby at birth, 27  
  of baby before and after feeding, 188  
  of mother after childbirth, 161  
  of young baby, 139  
Witches' milk, 133  
Womb, 13  
  changes after delivery in, 158  
  changes in pregnancy in, 29, 38, 45, 51, 109  
  displacements of, 14  
Worry during pregnancy, 86  
X-ray in diagnosis of pregnancy, 47



# *Sans Tache*



## *Sans Tache*

IN THE "elder days of art" each artist or craftsman enjoyed the privilege of independent creation. He carried through a process of manufacture from beginning to end. The scribe of the days before the printing press was such a craftsman. So was the printer in the days before the machine process. He stood or fell, as a craftsman, by the merit or demerit of his finished product.

Modern machine production has added much to the worker's productivity and to his material welfare; but it has deprived him of the old creative distinctiveness. His work is merged in the work of the team, and lost sight of as something representing him and his personality.

Many hands and minds contribute to the manufacture of a book, in this day of specialization. There are seven distinct major processes in the making of a book: The type must first be set; by the monotype method, there are two processes, the "keyboarding" of the MS and the casting of the type from the perforated paper rolls thus produced. Formulas and other intricate work must be hand-set; then the whole brought together ("composed") in its true order, made into pages and forms. The results must be checked by proof reading at each stage. Then comes the "make-ready" and press-run and finally the binding into volumes.

All of these processes, except that of binding into cloth or leather covers, are carried on under our roof.

The motto of the Waverly Press is *Sans Tache*. Our ideal is to manufacture books "without blemish"—worthy books, worthily printed, with worthy typography—books to which we shall be proud to attach our imprint, made by craftsmen who are willing to accept open responsibility for their work, and who are entitled to credit for creditable performance.

The printing craftsman of today is quite as much a craftsman as his predecessor. There is quite as much discrimination between poor work and good. We are of the opinion that the individuality of the worker should not be wholly lost. The members of our staff who have contributed their skill of hand and brain to this volume are:

*Composing Room:* Edward Rice, Nathan Miller, Anthony Wagner, William Fite, Andrew Rassa, Henry Shea, James Jackson, Charles Wyatt, William Sanders, James Armiger, Richard King, Theodore Nilson, George Moss, Walter Phillips.

*Keyboard:* Katharine Kocent, Hannah Scott, Harry Susemihl.

*Casters:* Kenneth Brown, Ernest Wann, Mahlon Robinson, Charles Aher, George Smith, Frank Malanosky, Martin Griffen, Henry Lee, Charles Fick.

*Proof Room:* Sarah Katzin, Mary Reed, Alice Reuter, Lucille Bull, Geraldine Browne, Audrey Tanner, Ruth Treischman, Ethel Strasinger, Dorothy Strasinger, Angeline Eifert, Lillian Gilland, George Southworth, Ida Zimmerman, Catherine Miller.

*Press:* Leo Ledlich, Fred Lucke, Clarence Ridgeway, Thomas Shreck.

*Folder:* Laurence Krug, Shipley Dellinger.

*Cutter:* William Armiger.

*For Every One Interested in the Child*

# INFANT MORTALITY

## *AND ITS CAUSES*

*By*

ROBERT MORSE WOODBURY, PH.D.

*Formerly Director of Statistical Research,  
United States Children's Bureau*

The most extensive and searching inquiry into the problem of infant mortality in the United States yet made—the most complete made anywhere.

*Cloth, gold stamped 5 $\frac{3}{8}$  x 8 204 pages*

*Price \$3.50*

THE WILLIAMS & WILKINS COMPANY

*Publishers of Scientific Books and Periodicals*

BALTIMORE, U. S. A.





25.B.80

Mother and unborn child; a litt1927

Countway Library

BFX5886



3 2044 046 442 778

DATE DUE

~~APR 06 1999~~

~~OCT 09 2001~~

~~NOV 5 2001~~

*1525*  
MAR 10 2001

Please Do Not Remove This Card from Pocket

CALL (617) 432-2136 TO RENEW  
HAVE ID NUMBER READY  
AND BARCODE NUMBER OF BOOK

EMAIL To: librenew@nms.harvard.edu

25.B.80

Mother and unborn child; a litt

Countway Library

BFX5886



3 2044 046 442 778